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THE NATIONAL QUESTION BOOK

A GRADED COURSE OF STUDY FOR TEACHERS AND STUDENTS

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PREFACE.

WITHIN the past few years there has arisen among all classes of teachers a desire for ampler qualification for their work. This is shown by the formation of Reading Circles, the large and constantly increasing number who subscribe for educational papers, the rapid issue of works upon education, and the establishment of Summer Schools of Methods. Not only are these various agencies indications of a desire for better preparation, but they also give evidence that there is an imperative demand for professional training or fitness.

Professional fitness for teaching consists primarily in a thorough acquaintance with those fundamental studies which are employed to give mental discipline as well as to furnish that equipment of knowledge most useful in the transactions of every-day life. But to know merely the studies he is to teach is not sufficient for the teacher. He should, besides, pursue those branches of learning which give fulness and ripeness of scholarship.

Whether a teacher's knowledge is broad and general, or whether it is only elementary, there must be coupled with it, to give proper fitness, a knowledge of Methods of Teaching. Certain principles recognized by educators underlie all methods of teaching, but the method itself results from actual practice and experience in applying

those principles. The possession, therefore, of good methods is a work depending solely upon the peculiar gifts and powers of each teacher. To possess that equipment of knowledge, however, which precedes mastery in methods, the teacher can be helped. If he have some system or plan of study by which he can both test and measure his progress, advancement becomes at once easy and encouraging. A standard so arranged as to make it widely accepted, and by which teachers can help themselves in making professional preparation for teaching, has long been lacking.

The object of *this book* is to afford such a standard and furnish such aid. It gives questions upon a graded Course of Study, and is not a collection or compilation of questions of all sorts. This Course of Study is based upon the average requirements of Normal Schools throughout the country, and is in accordance with the scheme on the opposite page.

The scheme of classifying teachers as Third Grade, Second Grade, and First Grade is very generally in use, though the actual acquirement necessary for each of these grades differs, sometimes even markedly so, in adjoining counties. It has long been desired by county superintendents, school commissioners, and teachers who go from one county to another, or from one State to another, that these differences should disappear. To help toward the accomplishment of such a result has been one of the aims kept prominently in mind in the preparation of The National Question-Book.

In the Course of Study each higher grade supposes, in addition to its own requirements, a thorough acquaintance with the subjects in all the grades below.

COURSE OF STUDY.

Third Grade.	Second Grade.	First Grade.	Professional.
Arithmetic.			Algebra.
Geography.	Geography.	Physical Geography.	
History of U. S.	History of U. S.		General History.
Grammar.	Grammar.	Grammar.	Geometry.
Orthography and Orthoëpy.	Rhetoric and Composition.	English Literature	Latin.
Reading.	Physiology.	Physiology.	Zoölogy.
	Bookkeeping.	Bookkeeping.	Astronomy.
	Civil Government	Civil Government.	Botany.
	Alcohol and its Effects upon the Body.	Natural Philosophy	Physics.
Theory and Practice of Teaching.	Theory and Practice of Teaching.	Theory and Practice of Teaching.	Chemistry.
			Geology.

The questions given under what is termed the Professional Grade have been selected from the New York examinations for State certificates, and represent fully the amount required in those subjects for the past ten years.

To the teacher this book will be found to possess a threefold advantage. First, it forms substantially a syllabus to guide in the thorough presentation of a study, and to lead to the discovery of omissions in teaching.

Containing a great amount of new material, the volume becomes particularly serviceable to those teachers who supplement the work of the text-books by giving their classes other matter.

Second, the book is a source from which to select examination questions, as well as to suggest new forms of these.

Third, the book affords help to the teacher when he himself occupies the position of student. One of the conditions surrounding his office is that of examinations —his license to teach and his promotion depending upon these. More or less often he must pass an examination, and to do this preparation is necessary. With but comparatively few exceptions, teachers are obliged to make their advance-preparation alone. In view of this fact, short answers are given to the questions presented in the book. These answers, however, are furnished as mere guides, and it is, of course, supposed that one who is making preparation in any study will amplify these fully, using them as an aid rather than as an absolute end.

It will be noticed that no answers are given to the questions upon the Theory and Practice of Teaching. While to a few of these questions answers satisfactory to all could be given, upon many others such a diversity of practice and, of course, of opinion obtains, that the entire omission of answers has been deemed best.

No questions have been inserted upon Writing or Drawing. The practice constantly gaining ground is not to spend time upon the intricacies of analysis. In drawing, too, through the influence of industrial work, the pupil is brought face to face with models, and

taught to draw them just as they appear, without any go-between whatever. In short, the tendency in both these subjects is to come at once to the real thing and do it as best it may be done, without leading up thereto indirectly.

The National Question-Book is put forth with the belief that it will be found a most serviceable work for students, teachers, and examiners. It is prepared with a sincere belief that it will be the means of advancing many a teacher from the Third to the Professional Grade—a position of the highest honor if not of the highest emolument.

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CHAPTER I.

ARITHMETIC.

For Third Grade.

1. Define Arithmetic. What is a unit? What is a number?

2. What is the unit of a number?

3. What is a concrete number? An abstract number?

4. What is notation? Name the kinds. Define each.

5. What is numeration? What is reading numbers?

6. What are figures?

7. State the law of Arabic notation.

8. Why is the Arabic system of notation also called a decimal system?

9. State the office of zero? What are the significant figures? What other names have they?

10. What is a place? What is meant by the orders of units? By periods?

11. Distinguish between the French and the English system of notation.

12. Name nine periods beginning with units.

13. What is the simple value of a figure? What the local value?

14. Name the fundamental processes of arithmetic.

ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION.

15. Show why we commence at the right to add.

16. How is addition verified?

17. To what is the difference of two numbers added to the less equal?

18. How is subtraction verified?

19. What kind of a number may a multiplicand, a multiplier, or a product be?

20. How multiply when there are zeros on the right of the multiplicand, on the right of the multiplier, or both?

21. What is the office of parenthesis-marks in arithmetic?

22. How else is division denoted than by the sign of division?

23. If dividend and quotient are given, how find divisor?

24. If divisor, quotient, and remainder, how find dividend?

25. What kind of numbers may dividend, divisor, or quotient be?

26. How divide when there are zeros at the right of the divisor? At the right of the dividend?

27. Define an exact divisor or factor. What is cancellation?

28. How is division verified?

29. What is the reciprocal of a number?

30. Illustrate the use of parenthesis and the vinculum.

31. When the multiplicand has two or more figures, where is the first figure of each partial product written, and why is it so written?

32. In multiplication which factor must be an abstract number, or used as such, and why?

33. Demonstrate that multiplication is a short method of performing addition.

34. Upon what principle is cancellation based?

35. What is an even number? An odd number? A factor?

36. What is a prime number?

37. When are numbers prime to each other?

38. What is a composite number?

39. What factors of two or more numbers does the greatest common divisor contain? Define greatest common divisor.

40. What factors of two or more numbers does the least common multiple contain? Define least common multiple.

41. Name all the prime numbers from 1 to 100 inclusive.

FRACTIONS.

42. Define a fraction; denominator; numerator; terms of a fraction.

43. Define and illustrate unit of a fraction and fractional unit.

44. What is the value of a fraction?

45. State the general principles of fractions.

46. What is the force of the word *of* in compound fractions?

47. Explain fully, showing principles involved, this example: $\frac{2}{3} \times \frac{5}{7}$.

48. Explain fully, showing principles involved, this example: $\frac{4}{9} \div \frac{3}{5}$.

49. What are complex fractions?

50. What is the value of a fraction multiplied by its denominator?

51. Give your reasons for calling a fraction whose value is less than a unit a *proper* fraction, and one whose value is equal to or greater than a unit an *improper* fraction.

52. Read correctly $\frac{1}{101}$, $\frac{1}{100}$, $\frac{4}{100}$, $\frac{2}{22}$, $\frac{1}{1000}$, $\frac{5}{1000}$, $\frac{3}{101}$, $\frac{5}{102}$.

53. What is the reciprocal of a fraction?

DECIMAL FRACTIONS.

54. Define decimal fractions.

55. What is the effect of removing the decimal-point one place to the left? One place to the right?

56. What is the effect of annexing a cipher to a decimal or removing one from its right?

57. How may an integer or a decimal be divided by 1 with ciphers annexed?

58. Write a circulating decimal, and define the term.

59. Write a repetend, and define the term.

60. Why do we point off in a product as many decimal places as there are in both multiplier and multiplicand?

61. Why do we point off in a quotient as many decimal places as those of the dividend are more than those of the divisor?

62. Upon what does the value of a decimal figure depend?

63. What is the difference between decimal fractions and common fractions?

FEDERAL MONEY.

64. What is money? Define Federal money. State the unit of Federal money.

65. Define coin or specie. What are greenbacks?

66. What is National currency?

67. Name the coins made of gold; of silver; of nickel; of bronze.

68. State what part of the gold and silver coin of the U. S. is alloy, and of what the alloy consists.

69. What is an aliquot part? What is an account?

70. Why are coins alloyed?

THE METRIC SYSTEM.

71. What is the unit of the metric system? Its length? How determined?

72. Give the meaning of the following terms: deka, hecto, kilo, myria, deci, centi, milli.

73. Name the standard unit of linear, of square, and of cubic measures; of measures of capacity and weight.

74. What is the are? What the stere?

75. How are the higher denominations in the metric system expressed? How the lower?

76. Explain how each unit of measure in this system is derived from the metre.

DENOMINATE NUMBERS.

77. Define a denominate number.

78. What is the standard unit of linear measure? Of liquid measure? Of dry measure? What is the standard unit of weight? Of time? Of circular measure?

79. What is the difference between the Troy and the Avoirdupois pound?

80. What is meant by a long ton? By a short ton?

81. How many cubic inches in a wine-gallon?

82. What is a civil day? What is the length of the solar year?

83. What is a board foot? A board inch?

84. Give the dimensions of a cord. What is a cord foot?

85. What are duodecimals, and for what used?

LONGITUDE AND TIME.

86. What is the greatest difference in time that two places may have?

87. If two places are in east or west longitude, how find the difference of longitude?

88. When one is in east and the other in west longitude, how is the difference found?

89. How does the local time of any place compare with the time at places west? At places east? Why?

PERCENTAGE.

90. Write a formula showing how to find the percentage when base and rate are given.

91. A formula to find rate from base and percentage.

92. A formula to find base from rate and percentage.

93. Define commission; cost, net cost, and gross cost; price, net price, and gross price.

94. What is a broker? A consignment? A consignor? A consignee?

INSURANCE AND TAXES.

95. What is the premium? The policy?

96. State how to find the sum to be insured in order to cover loss and premium.

97. What is a poll-tax? What are assessors?

98. What is meant by the rate?

99. How is the rate found, when the amount to be raised and the assessed value of property are given?

INTEREST.

100. What is the 6% method?

101. What are *days of grace?*

102. How is exact interest calculated?

103. What are partial payments?

104. Write a promissory note.

105. Define the terms maker, payee, holder.

106. What is the face of a note?

107. What is meant by an indorsement?

108. Write a negotiable note requiring indorsement.

109. Write a negotiable note *not* requiring indorsement.

110. Write a joint note.

111. Write a non-negotiable note.

112. Write a married woman's note.

113. What is meant by the maturity of a note?

114. State the two general principles upon which nearly all the rules for partial payments are based?

115. What is compound interest? How is it computed?

116. When a man is unable to write his name, in what way does he sign a note?

DISCOUNT.

117. What is discount? What is true discount?

118. Define present worth. How is it found?

119. What is bank discount? Define the proceeds of a note.

120. What is a protest?

121. How does the interest on the present worth for the given time and rate compare in value with the true discount of the debt for the same time and rate?

122. How do the bank discount and the true discount of a debt for the same time compare in value, not reckoning grace?

123. Write a sight draft. Write a time draft.

STOCKS.

124. What is stock? What is meant by a share?

125. What is scrip?

126. Define the terms par value, market value, above par, at par, below par.

127. What is an assessment? What an installment?

128. What is meant by gross earnings? By net earnings?

129. What is a dividend?

130. Upon what value of stocks are brokerage, installments, and assessments estimated?

PARTNERSHIP.

131. Define partnership; capital; assets; liabilities.

132. If partners furnish equal or unequal shares of capital for the same time, how is the profit or loss divided?

133. If they furnish equal or unequal shares for different times, how is the profit or loss distributed?

EXCHANGE.

134. What is exchange? How many kinds are there?

135. Write a draft or bill of exchange, and name the drawer, payee, and drawee of the draft.

136. What is meant by the acceptance of a draft?

137. What does the par of exchange mean?

138. What is meant by a set of exchanges?

139. What is the exchange value of the pound sterling? Of the franc? Of the mark?

140. What is meant by the course of exchange?

EQUATION OF PAYMENTS, AND AVERAGING ACCOUNTS.

141. What is meant by equation of payments?

142. What is average or equated time?

143. What is the term of credit?

144. What is averaging accounts?

RATIO AND PROPORTION.

145. Give an example of two ways in which two numbers may be compared with each other.

146. Which of these comparisons results in ratio?

147. Define ratio.

148. Define antecedent; consequent; terms of the ratio.

149. What is the reciprocal of a ratio?

150. Define proportion.

151. Define extremes and means of a proportion.

152. Write three numbers in proportion, and give the name to the second figure used.

153. Write a direct proportion.

154. What is a compound proportion?

155. From what is the sign of proportion (::) derived?

156. In how many forms can a ratio be written?

157. What is the ratio of $\frac{1}{2}$ to $\frac{9}{27}$?

158. What is the difference between a ratio and a proportion?

159. Why are three terms necessary to solve a proportion?

160. Why is proportion often called Rule of Three?

INVOLUTION AND EVOLUTION.

What is a power?

161. What is an exponent?

162. How is a common fraction raised to a power?

163. How is a mixed number raised to a power?

164. What reason is there for calling the second power a square? The third power a cube?

165. How does the number of figures in the square of a number compare with the number of figures in the root?

166. How does the number of figures in the cube compare with the number of figures in the root?

167. What is a root?

168. Define square root. Define cube root.

169. Make a radical sign, and state its use.

170. What is the index of the root? When is it not written?

171. How else than by the radical sign and index may a root be denoted?

172. What is a perfect power? What an imperfect power?

173. How are decimals pointed off in square and cube root?

174. Tell why in extracting the square or cube root of a number we divide it into periods of two or three figures.

175. How do you find the root of a decimal?

176. How is the root of a common fraction found?

177. Draw a right-angled triangle, and against each of its sides write the name of the side.

178. Tell how each of these sides is found when the other two are given.

179. How is the sixth root of a number obtained?

PROGRESSIONS.

180. Define a progression. What are the terms of a progression?

181. How many kinds of progressions are there? Wherein do they differ?

182. Write an ascending series and a descending series, and let the common difference in the last be twice that in the first.

183. Name the five elements or parts that are always to be considered in solving problems in progressions.

184. Write formulas for finding three of the parts.

185. Write a geometrical progression, ascending series. Write one, descending series.

186. Write formulas for finding three parts or elements of a geometrical series.

MENSURATION.

187. How do you find the area of a triangle from the base and altitude?

188. How when the three sides are given?

189. How is the area of an oblong found?

190. How the area of a trapezoid?

191. How the area of a trapezium?

192. What is the diagonal of a figure? What the perimeter?

193. How is the circumference found when the diameter is given?

194. How is the area of a circle found?

195. Show that in finding the area of a triangle, a trapezoid, a hexagon, and a circle each may be regarded as changed into an oblong.

196. What is a solid? What a prism?

197. How find the solid contents of a triangular prism?

198. How the solid contents of a rectangular prism?

199. What is a cylinder? How is its lateral surface found?

200. How find its solid contents?

201. What is a sphere? How find the surface of a sphere?

202. How its contents when the diameter is given?

203. Define a pyramid.

204. How is its lateral surface found? How its solid contents?

205. What is the frustum of a pyramid?

206. Define a cone.

207. How is its lateral surface found? How its solid contents?

EXAMPLES FOR TEST.

1. Find the greatest common divisor of 256, 480, and [illegible]

2. What is the value of $\frac{38-.4}{2}+\frac{16-.8}{4}-\frac{5}{2}\times 7\frac{7}{10}$?

3. What is the sum of $\frac{\frac{3}{5}\text{ of }\frac{5}{6}}{\frac{1}{2}}$ and $\frac{\frac{4}{7}\text{ of }\frac{7}{12}}{\frac{4}{9}\text{ of }2\frac{1}{4}}$?

4. Extract the square root of 4.932841.

5. How does the number of cubic inches in a ball 8 in. in diameter compare with the number in one 4 in. in diameter?

6. How many yards of carpeting 2 ft. wide will be required to cover a floor 15 ft. long and 10 ft. wide?

7. (*a*) If I sell $\frac{3}{4}$ of an article for what I paid for the whole, what per cent do I gain? (*b*) If I sell the whole for what I paid for $\frac{3}{4}$ of it, what per cent do I lose?

8. How shall a pair of boots that cost $4 be marked so that I may fall $16\frac{2}{3}\%$ from marked price and yet make 25% on cost?

9. The difference in time between two places is 11 hr. and 33 min. What is the difference in longitude?

10. Worth Brothers bought a cargo of 120 tons of coal, $\frac{3}{5}$ of which belonged to William and $\frac{2}{5}$ to Clarence Worth. John [illegible], coming in on the arrival of the cargo, said: "[illegible], I will give you $150, and we will divide the

coal equally among us." How shall the $150 be divided between the Worth Brothers?

11. What is the area and circumference of a circle whose diameter is 15 ft.?

12. A milkman put a pint of water into every gallon of milk. If pure milk is worth 6 cts. a quart, how much were 12 gals. of the milkman's worth?

13. If 82 men build a wall 36 ft. long, 8 ft. high, and 4 ft. thick in 36 da. in how many days will 48 men build a wall 64 ft. long, 6 ft. high, 3 ft. thick? Solve by proportion and give reasons for each ratio.

14. Find the cube root of 19.54 carried to four decimal places.

15. Which is the better investment and how much on $100: 8% stock bought at a premium of 20%, or 5% [illegible] bought at a discount of 20%?

16. $\frac{4}{5}^2 + \frac{4}{5}^3 =$ what?

17. What sum must be invested in Missouri 7s at [illegible] secure an annual income of $1000?

18. A promissory note is given payable on dema[illegible] $975 at 7%. How much will settle this note 4 yr. [illegible] 15 da. after date?

19. What is the exact time in days between J[illegible] 1857, and Jan. 20, 1860?

20. A merchant marked cloth to sell @ 12% advance on cost, but owing to a rise in the goods marked it up 8% on the former retail price. What per cent on cost was it last marked?

21. From what price can I fall 20% on flour which cost me $5.80 per bbl. and still make 12%?

22. How many cubic feet of snow are there upon an acre of land covered evenly to the depth of 5 in.?

23. Reduce 53684″ to numbers of higher denomination.

24. To what number does $\frac{1}{2}$ bear the same [illegible]sts between 5 and 17?

25. How many cubes 3 in. on a side are there in a cubic feet?

26. 7 fur. 8 rd. 2 yd. = what decimal of a mile?

27. At $1.25 per gallon what cost 1 bbl. 15 gal. 3 qt. of molasses?

28. A ladder 60 ft. in length was found to reach just to the eaves of a building when its foot was 36 ft. from the foundation. What was the height of the building?

29. What must be the depth of a cylindrical cistern whose diameter is 8 ft. that it may contain 80 bbl.?

30. The diameter of the moon being to that of the earth as 3 : 11, what is the relation between their volumes?

31. A merchant bought goods at 25% below their nominal price and sold them at 20% above, thereby making $1920. How much did he invest?

32. If a ball of thread is 4 in. in diameter, what part of the thread will be left when the diameter is reduced to 2 in.?

33. What is the time of day, provided the time past noon equals $\frac{2}{3}$ of the time to midnight?

34. Bought a $500 note, rate of interest 10%, due 6 mo. from the time I bought it, which was 2 yr. 8 mo. from its date. I paid $580 for the note, but had to borrow $400 at the bank for 30 da. at 2% a month, grace allowed. How much did I make, allowing money to be worth 7%?

35. If I buy bonds for 85 cts on a dollar which pay 3% semi-annual interest, what per cent per annum does this yield me on my investment?

36. Three men, A, B, and C, agree to do a certain piece of work. A and B can do the work in $6\frac{2}{3}$ da.; B and C in 12 da.; and A and C in 10 da. How long will it take each separately to do it?

37. A cistern is 4 metres long, 24 decimetres wide, and 80 centimetres deep. How much water will it hold in cubic metres? In litres?

38. The longitude of St. Petersburg is 39° 19′ east; of New York 74° 41′ west. When it is 1 o'clock in the afternoon at St. Petersburg, what time is it at New York?

39. Find the difference between the true and the bank discount on $2500 payable in 3 mo. at 7%, making no allowance for grace.

40. Find the cost of plastering the walls and ceiling of a room 7 metres long, 5 wide, and 3½ high, at 20 cts. per square metre; deducting for a base-board 25 centimetres wide, around the room, and 18 square metres more for doors and windows. How high is the room in feet and inches?

41. Having received a stock dividend of 8%, I now own 297 shares. Find how many shares I had before the dividend was declared.

42. If two men, working 10 hr. a day for 94½ da., dig a trench 33¾ yd. long, 2⅝ wide, and 2⅔ deep, find how many hours a day 35 men must work for 11 da., to dig a trench 90 yd. long, 1⅚ wide, and 2¼ deep.

43. Of a debt, one third is to be paid in 2 mo., one fourth in 6 mo., one sixth in 10 mo., and the balance in 1 yr. Find at what time, in equity, the whole should be paid, if all the payments were converted into one.

44. A speculator had 5000 bbl. of flour that cost him $8 per bbl.; he sold 30% of the lot at an advance of 10% on the cost, and 50% of the remainder at a further advance of 2½% on the cost; and he closed out the lot at $8.50 per bbl. Find how much he made, and what percentage of the cost.

45. Find what principal will amount to $1000 in 3 yr. 6 mo. at 3½ %, compound interest.

46. Upon a note for $1000, dated January 1, 1878, due in one year, and bearing interest at the rate of 6% from the date of maturity, the following payments were made:

August 16, 1879	$300
February 12, 1880	200
October 3, 1881.	50
Januray 27, 1882	19
May 31, 1883	22

What was due January 1, 1884, by the United States rule for the computation of partial payments?

ANSWERS TO ARITHMETIC. THIRD GRADE.

1. Arithmetic is the science of numbers.
One, or a single thing, is a unit.
A number is a unit or a collection of units.

2. *One* of the kind expressed by the number.

3. A number used in reference to some object is a concrete number. An abstract number is one not applied to any object.

4. Notation is the method of writing numbers. Arabic and Roman. Arabic notation expresses numbers by figures, Roman notation expresses numbers by letters.

5. Numeration is the method of reading numbers. Reading numbers is dividing them into periods, giving to each its proper name.

6. Figures are characters used to express numbers.

7. Figures increase tenfold in value each place to the left, and decrease tenfold in value each place to the right.

8. Because the order of units increases by the scale of ten.

9. Zero is used to mark vacant orders. 1, 2, 3, 4, 5, 6, 7, 8, 9. Digits.

10. The place is the position a figure occupies with reference to the unit. By the orders of units is meant the increase of the unit by tens. The groups of figures containing the hundreds, tens, and units of any denomination are periods.

11. The French system divides a number into periods of three figures, naming them units, tens, hundreds ; the English system divides a number into periods of six figures, naming them units, tens, hundreds, thousands, tens of thousands, and hundreds of thousands.

12. Units, thousands, millions, billions, trillions, quadrillions, quintillions, sextillions, septillions.

13. The simple value of a figure is the number of units it expresses ; the local value, the number it expresses as determined by the place it occupies from units.

14. Addition, subtraction, multiplication, division.

15. Because the lowest order of units is at the right, and also that we may carry the tens as we proceed.

16. By adding each column in a reverse order.

17. The difference of two numbers added to the [illegible] to the greater number.

18. Add the remainder to the subtrahend, and if the result equals the minuend the work is verified.

19. A multiplicand may be an abstract or concrete number ; a multiplier must be an abstract number ; a product may be abstract or concrete as the multiplicand is abstract or concrete.

20. Multiply the significant figures together, and place as many ciphers on the right of the product as there are zeros on the right of multiplicand or multiplier or both.

21. They signify that the expression within them is to be taken as a whole.

22. By writing the dividend over the divisor with a short line between them.

23. By dividing the dividend by the quotient.

24. By multiplying the divisor by the quotient and adding the remainder.

25. The dividend may be abstract or concrete ; the divisor must be abstract ; the quotient will be abstract or concrete as the dividend is abstract or concrete.

26. Cut off the ciphers in the divisor and as many figures in the dividend. Divide the rest of dividend by the significant figures in the divisor. If there is a remainder, annex the figures cut off the dividend to the right of remainder for true remainder. If there is no remainder, the figures cut off from dividend are the true remainder. When there are zeros at the right of the dividend, if the significant figures of the dividend are exactly divisible by the divisor, annex as many ciphers at the right of the quotient as there are ciphers at right of dividend; otherwise treat zeros at the right of the dividend as if they were significant figures.

27. An exact divisor or factor of a number is one which will divide it without a remainder. Cancellation is a method of shortening computations by rejecting equal factors from the divisor and dividend.

28. Multiply the divisor by the quotient; to the product add the remainder.

29. One divided by that number.

30. $(8 + 3 - 2) \times 4$, $\overline{8 + 3 - 2} \times 3$.

31. The first figure of each partial product is written under the multiplying figure, because it is of the same order.

32. The multiplier, because it shows how many times the multiplicand is taken.

33. $6 + 6 + 6 + 6 + 6 = 30$, or 6 taken 5 times.

34. Dividing both dividend and divisor by the same number does not change the value of the quotient.

35. An even number is one exactly divisible by 2. An odd number is one not exactly divisible by 2. A factor of a number

is one of the numbers which being multiplied together produce that number.

36. A prime number is one that cannot be produced by the multiplication of any numbers except itself and 1.

37. Numbers are prime to each other when the only number by which they can be exactly divided is 1.

38. A composite number is one that can be resolved into factors.

39. The common prime factors.

40. All the prime factors of the numbers.

41. 1, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97.

42. One or more of the equal parts of a unit is a fraction. The denominator is the number showing into how many equal parts the unit is divided. The numerator is the number showing how many parts are expressed. The terms of the fraction are the numerator and denominator.

43. The unit which is divided into equal parts is the unit of a fraction, and one of the equal parts into which the unit is divided is the fractional unit. In the fraction $\frac{1}{4}$, the unit of the fraction is 1, the fractional unit $\frac{1}{4}$.

44. The value of a fraction is the quotient of the numerator divided by the denominator.

45. Multiplying the numerator or dividing the denominator multiplies the value of the fraction. Dividing the numerator or multiplying the denominator divides the value of the fraction. Multiplying or dividing both numerator and denominator by the same number does not change the value of the fraction.

46. It is equal to the sign of multiplication.

47. $\frac{3}{8} \times \frac{5}{7}$. Multiply $\frac{3}{8}$ by 5 by multiplying numerator by 5 and it equals $\frac{15}{8}$. It was required to multiply by $\frac{5}{7}$, hence the product $\frac{15}{8}$ is 7 times as great as the true product; and to get the true product divide by 7, which is done by multiplying the denominator by 7, and it equals $\frac{15}{56}$. Hence $\frac{3}{8} \times \frac{5}{7} = \frac{15}{56}$.

48. $\frac{4}{9} \div \frac{3}{5}$. Divide $\frac{4}{9}$ by 3 by multiplying the denominator by 3 and it equals $\frac{4}{9} \times 3 = \frac{4}{27}$. $\frac{4}{9}$ has been divided by 3. It was required to divide by $\frac{3}{5}$, hence the quotient $\frac{4}{27}$ is 5 times as small as true quotient, and to get the true quotient multiply $\frac{4}{27}$ by 5, which is done by multiplying the numerator by $5 = \frac{20}{27}$. Therefore $\frac{4}{9} \div \frac{3}{5} = \frac{4}{9} \times \frac{5}{3} = \frac{20}{27}$.

49. Complex fractions are those having a fraction for their numerator or their denominator or for both.

50. The value of a fraction multiplied by its denominator would be equal to the numerator standing alone.

51. As a fraction is one or more of the equal parts into which a unit is divided, only divisions of a unit expressed by fractions

with the numerator less than the denominator are properly fractions. Hence such a fraction is called a *proper* fraction. When the numerator is equal to or greater than the denominator it expresses a unit or more than a unit and is not properly a fraction; hence it is called an *improper* fraction.

52. $\frac{1}{10}$, One one-hundred-first; $\frac{1}{100}$, one hundredth; $\frac{4}{100}$, four hundredths; $\frac{2}{22}$, two twenty-seconds; $\frac{1}{1000}$, one thousandth; $\frac{5}{10000}$, five thousandths; $\frac{3}{101}$, three one-hundred-firsts; $\frac{5}{102}$, five one-hundred-seconds.

53. The fraction inverted.

54. Decimal fractions are those in which the unit is divided into tenths, hundredths, thousandths, etc.

55. Removing the decimal point one place to the left diminishes the value of the number 10 times; one place to the right increases the value of the number 10 times.

56. It has no effect.

57. By removing the decimal point as many places to the left as there are ciphers.

58. A circulating decimal is one in which the same figure or set of figures recurs in the quotient: .6666 + ; .272727 +.

59. A repetend is the figure or set of figures repeated. In .6666 +, 6 is a repetend; in .272727 + , 27 is a repetend.

60. $.526 \times .062 = \frac{526}{1000} \times \frac{62}{1000} = \frac{32612}{1000000}$; or, written decimally, .032612. By comparison it is seen that the decimal places of the product equal those of the multiplicand and multiplier.

61. Division is the opposite of multiplication, the quotient answering to multiplicand, the divisor to multiplier, and the dividend to product; the decimal places in the dividend are equal to those in the product; the decimal places in the divisor to those in the multiplier; hence the decimal places in the quotient must be equal to those of the dividend minus those of the divisor.

62. The value of a decimal figure depends upon the place it occupies from the decimal point.

63. The name common fractions is applied to any class of fractional quantities, while the name decimal fractions is applied to only those whose denominator, expressed or understood, is 10, or any power of 10.

64. Money is a measure of value and a medium of exchange. Federal money is the national currency of the United States. The unit of Federal money is the dollar.

65. Coin or specie are pieces of metal stamped and having a value fixed by law. Greenbacks are paper money of the United States, consisting of Treasury notes issued by the Government.

66. National currency is the notes issued by the national banks.

67. Of gold—double-eagle, eagle, half-eagle, quarter-eagle, three-dollar piece, and dollar; of silver—dollar, half-dollar, quar-

ter-dollar, and dime; of nickel—5-cent and 3-cent pieces; of bronze, the cent.

68. One tenth is alloy. The alloy of the gold coin is composed of one tenth silver and nine tenths copper; of the silver coin, pure copper.

69. An aliquot part is a factor or an exact divisor. An account is a business record of debits and credits between two persons.

70. The gold and silver in their pure state are too soft and flexible for coinage, and are therefore hardened by compounding them with a baser metal or alloy.

71. The metre, 39.37 + inches. It is nearly one ten-millionth part of a quadrant of the earth's meridian circle.

72. From the Greek we have deka, 10; hecto, 100; kilo, 1000; myria, 10,000: from the Latin, deci, 10; centi, 100; milli, 1000.

73. The unit of linear measure is the metre; of square measure, the sq. metre; of cubic measure, the cu. metre; of measures of capacity, the litre, equal to 1.0567 liquid qts., or .908 dry qts.; of weight, the gram, equal to 15.432 grains.

74. The are is the unit of land measure, equal to a sq. dekameter; the stere is the unit of wood measure, equal to one cubic metre.

75. The higher denominations are expressed by prefixing to the unit the Greek syllables deka, hekto, kilo, myria; the lower denominations by prefixing to the unit the Latin syllables deci, centi, milli.

76. The are is a sq. metre; the stere is a cu. metre; the litre is equal to one cu. decimetre; and the gram is equal to the weight of one cu. centimetre of distilled water at its greatest density, 39.8° Fahr.

77. A denominate number is a term applied to concrete numbers which represent money, weight, or measure.

78. The yard. The gallon. The bushel. A Troy pound. The mean solar day. A degree.

79. The Troy pound contains 5760 grains, and the avoirdupois pound contains 7000 grains.

80. A long ton contains 2240 pounds, a short ton 2000 pounds.

81. 231 cu. in.

82. A day adopted by government for business purposes. In most countries it begins and ends at midnight, is divided into two parts of 12 hours each, the former being designated A.M., the latter, P.M. 365 days, 5 h., 48 m., 46 sec.

83. A board foot is 1 ft. long, 1 ft. wide, and 1 in. thick. A board inch is $\frac{1}{12}$ of a board foot.

84. A cord is a pile 8 ft. long, 4 ft. wide, and 4 ft. high. A cord foot is $\frac{1}{8}$ of a cord.

85. The parts of a unit resulting from continually dividing by

12. They are applied to the measurement of extension, the foot being taken as a unit.

86. 12 hours.

87. Subtract the less longitude from the greater.

88. By adding the two longitudes together, and if their sum is more than 180°, subtract this from 360°.

89. It is earlier. It is later. Because the earth revolving on its axis from west to east causes the sun to rise earlier at places east of us, and set later at places west of us.

90. Base × Rate = Percentage.

91. Percentage ÷ Base = Rate.

92. Percentage ÷ Rate = Base.

93. Commission is an allowance to agents for the transaction of business. The cost is that which is paid for anything. Net cost is cost without adding any other expenses, as freight, storage, commission, etc. Gross cost is net cost plus all expenses. The price is that for which anything is sold, or the value asked for it. The price minus all expenses, as commission, freight, and other expenses, is net price. Net price plus all expenses is gross price.

94. A broker is one who buys and sells stocks, bills of exchange, etc. Goods sent to an agent to be sold are called a consignment. The person sending them is the consignor. The person to whom they are sent the consignee.

95. The sum paid for insurance. The agreement between the insurance company and person insured.

96. Divide the value of the property by 1, minus the rate.

97. A personal tax assessed upon males over 21 years of age. Persons appointed to appraise property for the purpose of taxation.

98. The per cent on the valuation of property to be taxed.

99. By dividing the amount to be raised by the assessed value.

100. Take half the number of months for cents and one sixth of the days for mills, and multiply the principal by their sum.

101. A note does not become legally due until three days after the specified time. These three days are called *days of grace.*

102. By reckoning the entire number of years, and the exact number of days over, calling the days 365ths of a year.

103. Payments in part of a note at different times.

104. $600. NEW YORK CITY, June 1st, 1889.

Six months after date, I promise to pay to the order of George Adams six hundred dollars, with interest at 6%, value received.

PAUL JONES.

105. The person who signs the note is the maker. The one to whom it is made payable, the payee. The one who has possession of it, the holder.

106. The sum whose payment is promised.

107. A statement of the amount of a payment and the date when made, written on the back of a note.

108. $600. NEW YORK CITY, June 1st, 1889.

Sixty days after date, I promise to pay to the order of George Adams six hundred $\frac{00}{100}$ dollars at First National Bank, value received.

PAUL JONES.

109. $600. NEW YORK CITY, June 1st, 1889.

Eight months after date, I promise to pay to George Adams or bearer six hundred dollars, at First National Bank, value received with interest.

PAUL JONES.

110. $600. NEW YORK CITY, June 1st, 1889.

Six months after date, we jointly and severally promise to pay George Adams or order six hundred dollars at First National Bank, value received.

PAUL JONES.
JOHN ROGERS.

111. $600. NEW YORK CITY, June 1st, 1889.

Six months after date, I promise to pay to George Adams six hundred dollars at my house, 123 Sixth Avenue, value received.

PAUL JONES.

112. $600. NEW YORK CITY, June 1st, 1889.

Three months after date, I promise to pay to the order of Paul Jones six hundred dollars at First National Bank, value received; hereby charging my separate estate and property.

SARAH PRIME.

113. The day upon which it becomes legally due.

114. (1) The principal cannot be lessened until the accrued interest is paid. (2) Interest cannot draw interest.

115. Interest upon interest. By computing the interest upon the principal and interest, combined at regular intervals.

116. By making a cross or mark.

117. A deduction made from a sum of money to be paid. True discount is a deduction made for the payment of a sum of money before the time when it is due.

118. That sum which, if put at interest for the given time and rate, will amount to the sum due. By dividing the debt by the amount of $1 for the given time and rate.

119. Bank discount is simple interest on the amount due, paid in advance. The face of the note minus the discount.

120. A written declaration made by a notary public that a note has been duly presented to the maker and has not been paid.

121. It is the same as the true discount.

122. Suppose the note were for $150, and the time of discount 90 days at 6%. The bank discount would be $150 × .015 int. on $1 for 90 days = $2.25.

$150 ÷ $1.015 amount of $1 for 90 days = $147.7832 present worth of note.

$150 − 147.7832 = $2.2168 true discount; $2.25 bank discount − $2.2168 true discount = $.0332 difference.

$2.2168 × .015 int. of $1 for 90 days = $.0332.

Hence bank discount is greater than the true discount by the interest on the true discount for the given time and rate.

123. $600. FIRST NATIONAL BANK,
NEW YORK CITY, June 1st, 1889.

At sight, pay to the order of George Adams six hundred $\frac{0}{100}$ dollars, value received.

To First National Bank, Chicago, Ill. } PAUL JONES, Cashier.

$600. NEW YORK CITY, June 1st, 1889.

Three days after sight, pay to the order of George Adams six hundred dollars, value received.

To Thomas Andrews. PAUL JONES.

124. The fund or capital of an incorporated company. One of the equal divisions of the capital stock.

125. Written statements specifying the number of shares to which holders are entitled.

126. The value named on the face of the scrip is the par value; the sum for which it sells, the market value; when stocks sell for more than par value, they are above par; for the same as their face value, at par; and for less than their face value, below par.

127. A sum assessed upon the stockholders to make up deficiencies or losses. A portion of the capital stock paid by the stockholders.

128. The gross earnings are its entire receipts. The gross earnings minus all expenses.

129. A portion of the earnings divided among the stockholders.

130. Upon the par value.

131. The association of two or more persons in business for their common profit is partnership. The money employed in the business is the capital. The assets are the property of a person in his possession. The liabilities are his debts.

132. It is divided in proportion to the amount of capital each one furnishes.

133. Each takes such a part of the gain or loss as the capital of each partner for a month is of the entire capital for a month.

134. Exchange is the method of making payments between distant places without transmitting money. Two; domestic and foreign.

135. $600. NEW YORK CITY, June 1st, 1886.

Fifteen days after sight, pay to the order of the First National

Bank, Chicago, Ill., six hundred $\frac{0}{100}$ dollars, value received, and charge to the account of PAUL JONES.

To George Adams, Chicago, Ill.

The drawer is Paul Jones, the payee is the First National Bank, the drawee is George Adams.

136. Agreeing to pay it when it is due, which is done by the drawee writing "Accepted" across the face of the draft, with his name and the date.

137. The standard by which the value of the currency of different countries is compared.

138. Three bills of the same date and tenor, named respectively the first, second, and third of exchange. They are sent by different mails, so that if one is lost another may be presented; after one is paid the others are void.

139. $4.8665. $0.193. $0.238.

140. The fluctuation of bills from their par value.

141. Finding the average time of a payment of two or more sums due at different times.

142. The date at which the debts may be equitably settled by one payment.

143. The term which must pass before the debt is due.

144. Finding the mean or equitable time of payment of the balance of an account.

145. Finding how much one is greater or less than another, and finding how many times one number is contained in another.

146. The latter.

147. The relation which two numbers bear to each other, found by dividing the first by the second, is ratio.

148. The first number of the ratio is the antecedent; the second the consequent. The antecedent and consequent taken together are the terms of the ratio.

149. 1 divided by the ratio.

150. Proportion is an equality of ratios.

151. First and fourth terms of a proportion are the extremes, the second and third are the means.

152. 4 : 6 : : 6 : 9. 6 is the mean proportional.

153. 5 men : 9 men : : 15 days, time it requires 5 men to do the work : (27 days' time it requires 9 men to do the work.)

154. A proportion in which either ratio is compound.

155. From the sign of equality by erasing its middle part.

156. 12 : 48, $1\frac{2}{4}$.

157. $\frac{1}{2} = \frac{2}{3}\frac{7}{4}$, $\frac{9}{2}\frac{}{7} = \frac{1}{3}\frac{8}{4}$. The ratio of $\frac{1}{2}$ to $\frac{9}{2}\frac{}{7}$ is 27 : 18.

158. Ratio is the relation existing between two numbers found by division, and proportion is an equality of ratios.

159. Since the product of the extremes equals the product of the means, the two like terms given form a product of which the

unlike term is one factor. The other factor is the quotient of this product divided by the given factor.

160. Because three terms are given to find the fourth.

161. A small figure placed at the upper right-hand part of a number to denote what power is to be taken.

162. By raising each of its terms separately to the required power.

163. Reduce it to an improper fraction and then raise it to the required power.

164. The two dimensions of a square being equal, its area is obtained by finding the second power or square of either dimension. The three dimensions of a cube being equal, its volume equals the third power or cube of either dimension.

165. There are twice as many figures in the square, or one less than twice as many.

166. The cube contains three times as many, or one or two less than three times as many.

167. One of the equal factors of a number is a root.

168. Square root is one of the two equal factors of a number. Cube root is one of the three equal factors of a number.

169. $\sqrt{}$ It indicates that the root is to be extracted.

170. A figure placed above the radical sign to indicate the root to be taken. It is not written when the square root is to be taken.

171. By a fractional exponent, the denominator showing what root is required.

172. One whose root can be exactly obtained. One whose root cannot be exactly obtained.

173. By beginning at tenths and passing to the right, pointing off 2 figures in square root and 3 figures in cube root.

174. In square root into periods of 2 figures, because the power contains 2 times, or 1 less than 2 times, as many figures as there are in the root; and the cube contains 3 times, or 1 or 2 less than 3 times, as many figures as are in the root.

175. Begin at tenths and point off towards the right, and extract the root as in whole numbers.

176. If the numerator and denominator are perfect powers, extract their roots; if not, reduce the fraction to a decimal and extract its root.

177. Hypothenuse, $\measuredangle$ Perpendicular,
Base.

178. Base squared + perpendicular squared = hypothenuse squared; extract the square root.

Hypothenuse squared — base squared = perpendicular squared; extract the square root.

179. By extracting the square root of the given number and the cube root of the result.

180. A progression is a series of terms which increase or decrease by a common difference or a common ratio. The first and last terms are the extremes; the intermediate terms are the means.

181. Two. Arithmetical progression increases or decreases by common difference, geometrical progression increases or decreases by a common ratio.

182. Ascending series, 3, 6, 9, 12, 15; common difference, 3. Descending series, 30, 24, 18, 12, 6; common difference, 6.

183. The first term, the last term, the number of terms, the common difference or ratio, and the sum of all the terms.

184. $l = a + (n-1)\,d$; $s = \left(\frac{a+l}{2}\right)n$; $n = \frac{2s}{a+l}$.

185. Ascending series, 2 : 4 : 8 : 16 : 32 : 64. Descending series, 576 : 144 : 36 : 9.

186. $l = ar^{n-1}$; $s = \frac{lr-a}{r-1}$; $a = \frac{l}{r^{n-1}}$.

187. Multiply the base by half the altitude.

188. From half the sum of the three sides subtract each side separately, multiply the half sum and the three remainders together, and extract the square root of the product.

189. Multiply the base by the altitude.

190. Multiply the length between the parallel sides by one half their sum.

191. Multiply the diagonal by half the sum of the perpendiculars drawn from the vertices of the opposite angles to the diagonal.

192. A straight line joining the vertices of two angles not adjacent. The length of the line bounding it.

193. Multiply the diameter by 3.14159.

194. Multiply the circumference by half the radius.

195. Left for the student.

196. A solid is that which has length, breadth, and thickness. A solid having two ends equal polygons parallel to each other, and its sides parallelograms.

197. Multiply the area of the base by the height of the prism.

198. Multiply the area of the base by the altitude.

199. A roller-shaped solid of uniform diameter, having for its ends two equal parallel circles.

Multiply the circumference of the base by the altitude.

200. Multiply the area of the base by the altitude.

201. A solid every point of whose surface is equally distant from a point within called the centre.

Multiply the diameter by the circumference.

202. Multiply the square of the diameter by 3.14159, which

equals the surface. Surface multiplied by $\frac{1}{6}$ of diameter equals contents.

203. A solid whose base is a polygon, and which has for its other faces three or more triangles terminating in a common point called the vertex.

204. Multiply the perimeter of the base by one half the slant height.

Multiply the area of the base by $\frac{1}{3}$ of the altitude.

205. The part remaining after the top has been cut off by a plane parallel to the base.

206. A solid whose base is a circle, and whose convex surface tapers uniformly to the vertex.

207. Multiply the perimeter of the base by $\frac{1}{2}$ the slant height.

Multiply the area of the base by $\frac{1}{3}$ of the altitude.

SOLUTION OF EXAMPLES.

1. $256)480(1$ $\quad$ $32)1296(40$
$\quad 256$ $\quad$ $\quad 128$
$\quad 224)256(1$ $\quad$ $\quad 16)32(2$
$\quad\quad 224$ $\quad$ $\quad\quad 32$
$\quad 32)224(7$
$\quad\quad 224$ $\quad$ Ans. 16.

2. $38. \quad 16. \quad \frac{5}{2} + 7\frac{7}{10} = 19.25$
$\quad .4 \quad .8$
$2)37.6 \quad 4)15.2$
$\quad 18.8 \quad + \quad 3.8 = 22.6;\ 22.6 - 19.25 = 3.35$
$\quad$ Ans. 3.35.

3. $\frac{3}{5}$ of $\frac{5}{6} \div \frac{1}{2} = 1$
$\frac{4}{7}$ of $\frac{7}{12} \div \frac{4}{9}$ of $\frac{9}{4} = \frac{1}{3}$ $\quad 1 + \frac{1}{3} = 1\frac{1}{3}$
$\quad$ Ans. $1\frac{1}{3}$.

. . . .

4. $4.932841(2.221$
$\quad 4$
$42)93$
$\quad 84$
$442)928$
$\quad 884$
$4441)4441$
$\quad 4441$ $\quad$ Ans. 2.221.

5. Solids are to each other as the cubes of their like dimensions.

$8^3 : 4^3$

$8^3 = 512$ $\qquad$ $512 : 64$

$4^3 = 64$ $\qquad$ Ans. 8 times as many.

6. 150 sq. ft. in floor,
6 sq. ft. in 1 yd. carpet,
25 yds. needed. $\qquad$ Ans. 25 yds.

7. (*a*) In selling $\frac{3}{4}$ I gain $\frac{1}{4}$, or $33\frac{1}{3}\%$.

Ans. $33\frac{1}{3}\%$ gain.

(*b*) In selling $\frac{4}{4}$ I lose $\frac{1}{4}$, or 25%.

Ans. 25% loss.

8. As I wish to make 25% or $\frac{1}{4}$ on the cost, the boots sell for \$5.

$16\frac{2}{3}\% = \frac{1}{6}$, what I must fall, $\$5 = \frac{5}{6}$ of marked price, hence marked price is \$6. $\qquad$ Ans. \$6.

9. The sun apparently passes through 360° in 24 hrs., therefore $1^\circ = 4$ min., and $1' = 4$ sec.

Difference in time 11 hrs. 33 min. ÷ 4 gives $173^\circ - 15'$.

Ans. $173^\circ - 15'$.

10. William Worth owns 72 tons and gives 32 tons to John Moore.

Clarence Worth owns 48 tons and gives 8 tons to John Moore.

Moore pays \$150 for 40 tons or $\$3\frac{3}{4}$ per ton.

William Worth receives 32 times $\$3\frac{3}{4}$ or \$120.

Clarence Worth receives 8 times $\$3\frac{3}{4}$ or \$30.

Ans. William Worth \$120,
Clarence Worth \$30.

11. Taking the ratio of diameter to circumference as 1 : 3.1416

3.1416 × 15 = 47.124 ft. circumference.

23.562 half of cir. × 7.5 half of diameter = 176.715 sq. ft.

Ans. Cir. 47.124 ft.
Area 176.715 sq. ft.

12. To each gal. or 8 pts. 1 pt. of water is added. Hence $\frac{1}{9}$ of the mixture is water.

12 gal. pure milk @ 6 cts. a qt. = \$2.88.

12 gal. of milkman's is worth \$2.88 − \$.32 ($\frac{1}{9}$ of \$2.88) or \$2.56.

Ans. \$2.56.

13.

48 : 82
36 : 64
8 : 6
4 : 3
} days : : 36 : Ans.

Ans. $61\frac{1}{2}$ days.

1200 . .
360 19.540 | 2.6934
36 8
1596 | 11540
202800 9576
7020 | 1964000
81 1889109
209901 | 74891000
21708300 65197557
24210 | 9693443000
9 8603991504
21732519 |
2175674700
323160
16
2175997876 |

Ans. 2.6934.

15.

8% stock gives $\frac{8}{120}$ or $6\frac{2}{3}$% int.

5% stock gives $\frac{5}{80}$ or $6\frac{1}{4}$% int.

$6\frac{2}{3}$ int. on \$100 is \$6.66$\frac{2}{3}$
$6\frac{1}{4}$ int. on \$100 is 6.25
.41$\frac{2}{3}$

Ans. 8% stock better by $41\frac{2}{3}$ cts. on \$100.

16.

$$\frac{16}{5} + \frac{64}{5} = \frac{80}{5} = 16$$

Ans. 16.

17. Every dollar will gain $\frac{7}{104}$ of itself. It will take as many dollars to gain \$1000 int. as $\frac{7}{104}$ is contained times into 1000.

$$\frac{1000 \times 104}{7} = 14857\frac{1}{7} \text{ times.}$$

Ans. \$14857$\frac{1}{7}$.

18. .3354$\frac{1}{6}$ Int. of \$1 for 4 yr. 9 m. 15d. at 7%
975

162$\frac{1}{2}$
16770
23478
30186

327.03125
975.

\$1302.03125 Ans. \$1302.03 +

19. 350 days in 1857
365 days in 1858
365 days in 1859
20 days in 1860

1100 Ans. 1100 days.

20. Cost, 100%.
1st marking price 112% of cost
2d marking price 120$\frac{4}{5}$% of cost
advance 20$\frac{4}{5}$%. Ans. 20$\frac{4}{5}$%.

21. In order to make 12% I must sell for 112% of \$5.80, or \$6.496, and as I wish to fall 20% or $\frac{1}{5}$, this is $\frac{4}{5}$ of the asking price.

$\frac{6.496 \times 5}{4} = \$8.12.$ Ans. \$8.12.

22. 1 A. has a surface of 43560 sq. ft., which multiplied by the thickness $\frac{5}{12}$ ft., gives 18150 cu. ft. Ans. 18150 cu. ft.

23. 60 | 53684″
60 | 894′ 44″
14° 54′. Ans. 14° 54′ 44″.

24. 5 : 17 : : $\frac{1}{2}$: ?
17 × $\frac{1}{2}$ ÷ 5 = 1$\frac{7}{10}$. Ans. 1$\frac{7}{10}$.

25. 1 cu. ft. = 1728 cu. in.
1 cube 3 in. on a side contains 27 cu. in.
27)1728
64 Ans. 64 cubes.

26. $5\frac{1}{2}$ | 2 yds.
2
11 | 4.000000
40 | 8.36363600 rds.
8 | 7.2090909 furlongs.
.9011363 mile. Ans. .9011363 mile.

27. 1 bbl. = 31.5 gal. + 15.75 gal. = 47.25 gal.
$1.25 \times 47.25 = \$59.06\frac{1}{4}$. Ans. $\$59.06\frac{1}{4}$.

28.

$60^2 - 36^2 = 2304$.
$\sqrt{2304} = 48$. Ans. 48 ft.

29. 80 bbl. $\times$ $31\frac{1}{2}$ = No. of gal. $80 \times 31\frac{1}{2} \times \frac{231}{1728}$ = No. of cu. ft. in cistern.

231 cu. in. in 1 gal.

$\frac{231}{1728}$ cu. ft. in 1 gal. 8×8 (radius squared) $\times .7854$ = area of circular base in sq. ft.

$$\left(80 \times 31\tfrac{1}{2} \times \frac{231}{1728}\right) \div (8 \times 8 \times .7854) = 6.7 +$$

Ans. 6.7 + ft.

30. Solids are to each other as the cubes of their like dimensions, hence they bear the relation of $3^3 : 11^3$ or 27 . 1331.
The earth has therefore $49\frac{8}{27}$ times the volume of the moon.
Ans. $49\frac{8}{27}$.

31. He gained 45% of nom. price.
\$1920 is 45% of nominal price. .45)1920.00
\$ $4266\frac{2}{3}$ nom. price.
He bought for $\frac{3}{4}$ of nom. price or \$3200. Ans. \$3200.

32. 1st ball : 2d ball : : $4^3 : 2^3$ or as 64 : 8. Hence $\frac{1}{8}$ of the thread must be left. Ans. $\frac{1}{8}$.

33. The time from noon to midnight is 12 hrs. Let $\frac{5}{8}$ = time past noon and $\frac{3}{3}$ = the time to midnight. Then 12 hrs. = $\frac{5}{5}$, $\frac{3}{8}$ or the time = $4\frac{4}{5}$ hrs. or 4 o'clock and 48 min.
Ans. 4 o'clock and 48 min.

34. \$500 in 3 yrs. 2 m. amounts to \$658.33⅓.

Amt. of \$580 for 6 m. at 7% is \$600.30
Int. of \$400 at 2% for 33 d. is 8.80

\$609.10

\$658.33⅓ − \$609.10 = \$49.23. Ans. \$49.23 gained.

35. The investment yields \$6 in every \$85 = $\frac{6}{85}$ of 100% or $7\frac{1}{17}$%.

Ans. $7\frac{1}{17}$%.

36. A and B do $\frac{3}{20}$ in 1 day = $\frac{9}{60}$.
B and C do $\frac{1}{12}$ in 1 day = $\frac{5}{60}$.
A and C do $\frac{1}{10}$ in 1 day = $\frac{6}{60}$.
A, B, and C do $\frac{2}{60}$ of $\frac{1}{6}$ in 1 day.

$\frac{1}{6}$ what A, B, and C do in 1 day − $\frac{9}{60}$ (A and B in 1 da.) = $\frac{1}{60}$ C in 1 day.

$\frac{1}{6}$ what A, B, and C do in 1 day − $\frac{5}{60}$ (B and C in 1 da.) = $\frac{1}{12}$ A in 1 day.

$\frac{1}{6}$ what A, B, and C do in 1 day − $\frac{6}{60}$ (A and C in 1 da.) = $\frac{1}{15}$ B in 1 day.

Therefore C will require 60 days, A 12 days, and B 15 days.

Ans. { A 12 days. B 15 days. C 60 days.

37. 4 m. long.
2.4 m. wide 4 × 2.4 × .8 = 7.68 cu. m.
.8 m. deep.

A litre is .001 of a cu. metre, hence there are 7.68 ÷ .001 = 7680 litres.

Ans. { 7.68 cu. m. 7680 litres.

38.

		h.	min.
	39° 19′	1	0
	74° 41′	7	36
15)114	0 dif. in longitude	5	24

7h. 36 min. dif. in time.

Ans. 24 min. past 5 o'

39. Amt. of \$1 for 3 mo. at 7% = \$1.0175.

1.0175)2500

2457.002

2500
.0175

125
175
25

43.7500 Bank dis.
42.998

.752

2500
2457.002
42.998 True dis.

Ans. .752.

40. $7 \times 3\frac{1}{2} \times 2 = 49$ sq. m.
$5 \times 3\frac{1}{2} \times 2 = 35$ sq. m.
$7 \times 5 = 35$ sq. m.

119 sq. m. — 24 sq. m. = 95 sq. m.
\$.20 × 95 = \$19.00 Cost.

Deductions:

.25 × 7 × 2 = 3.5 sq. m.
.25 × 5 × 2 = 2.5 sq. m.

6 sq. m. Base board.
18 Doors and windows.
24 sq. m.

39.37 = no. of in. in M.

$3\frac{1}{2}$

118 11
19 $68\frac{1}{2}$

2)137.795 in.
11.483 ft.

.483 ft.
12

5.796 in.

Ans. { Cost \$19.
Height of room 11 ft. 5 + in.

41. 297 shares is 108% of the previous number.

1.08)297

275 shares. Ans. 275.

42.
$$\left.\begin{array}{l} 35:2 \\ 22:189 \\ 135:360 \\ 63:44 \\ 8:7 \end{array}\right\} \begin{array}{l} \text{h} \quad \text{h} \\ ::10:8 \end{array}$$

Ans. 8 hours.

43. $\frac{1}{3}$ in 2 mo. $= \frac{2}{3}$ payable in 1 mo.

$\frac{1}{4}$ " 6 " $= \frac{6}{4}$ " " " " "

$\frac{1}{6}$ " 10 " $= \frac{10}{6}$ " " " " "

$\frac{1}{4}$ " 12 " $= \frac{12}{4}$ " " " " "

$\frac{41}{6}$ " " " " "

or the whole in $6\frac{5}{6}$ mo.

Ans. $6\frac{5}{6}$ mo.

44. 30% of 5000 = 1500 bbl. $5000 \times \$8 = \$40000$ cost.

5000 − 1500 = 3500 bbl. $1500 \times \$8 \times \$1.10 = \$13200$ selling price.

50% of 3500 = 1750 " $1750 \times \$8 \times \$1.125 = \$15750$ " "

1750 bbl. = remainder. $1750 \times \$8.50 = \$14875$

43825

40000

$ 3825 gain.

$\frac{3825}{40000} = 9\frac{9}{16}\%$ gain.

Ans. { $3825 gain. / $9\frac{9}{16}\%$ of cost.

45. Compound int. of $1 for $3\frac{1}{2}$ yrs. at 6% is $1.128

1.128 = $886.52 +

Ans. $886

46. Prin. on int. from Jan. 1, 1879, to Aug. 16, 1879, $1000
Int. to Aug. 16, 1879, 37.50

Amt. $1037.50
Payment Aug. 16, $ 300

New prin , $ 737.50
Int. from Aug. 16, 1879, to Feb. 12, 1880, $ 21.63

Amt. $ 759.13
Payment Feb. 12, $ 200

New prin. $ 559.13
Int. from Feb. 12, 1880, to Oct. 3, 1881, $ 55.07

Amt. $ 614.20

[As the int. is greater than payment, there is no deduction of payment.]
Int. from Oct. 3, 1881, to Jan. 27, 1882, $ 11.669

Amt. $ 625.869
Payment Oct. 3, $50 $ 69
" Jan. 27, 19

$69 New prin. $ 556.87

Int. from Jan. 27, 1882, to May 31, 1883, $ 44.92

Amt. and new prin. $ 601.79
Payment smaller than int. and not deducted.
Int. from May 31, 1883, to Jan. 1, 1884, 21.067

Amt. $ 622.857
Deducting last payment of $22 22

$ 600.857
Ans. $600.857.

CHAPTER II.

GEOGRAPHY.

For Third Grade.

MATHEMATICAL.

1. Define the Equator, the Tropics, and the Polar Circles.

2. What is latitude? What longitude?

3. Give the width, in degrees, of each zone.

4. Upon a circle as a basis make a diagram that shall illustrate the relative position of the Equator, the tropics, the Polar Circles, and the zones, naming each.

5. Define meridian circles. Meridians.

6. What are the proofs that the earth is round?

7. What does the earth's rotation on its axis produce?

8. Of what use are parallels and meridians?

9. Give the cause of the change of the seasons.

10. Define a continent. An ocean. A sea. The sea.

11. Name the continents in order of size. The oceans in order of size.

12. How many degrees from the North Pole to the Tropic of Cancer?

13. What is meant by the cardinal and semi-cardinal points?

14. Which has the greater circumference—a parallel of 30° or a Tropical circle?

15. In what direction does the sun cast a shadow at noon in the south temperate zone?

16. What part of the earth's surface has no sunlight in June?

17. Why are the Polar Circles located $23\frac{1}{2}°$ from the Poles?

18. At what place on the globe must one be to have the sun in the zenith on the 22d of June?

19. What is the situation of places having the same length of day as our own?

20. Why does a telegram sent from New York at noon reach St. Louis before noon?

21. Do degrees of latitude differ in length?

22. Do degrees of longitude differ in length?

23. What is the length of the Equatorial diameter of the earth? How many miles shorter is the Polar diameter?

24. From what place is longitude now generally computed?

25. What name is given to the circles on which latitude is measured?

26. What meridian separates the eastern and the western hemispheres?

27. Distinguish between the rotation and the revolution of the earth.

28. What is meant by the *great circle of illumination?*

29. What is the Ecliptic?

30. What is meant by the Equinoxes?

31. What is meant by the Solstices?

NORTH AMERICA.

32. Draw quickly an outline map of North America, using no construction-lines.

33. Describe the general features of the surface of North America.

34. What part of North America is directly west of Great Britain?

35. Why is the climate of British Columbia warmer than that of Newfoundland and Labrador ?

36. Where is the Isthmus of Tehuantepec ?

37. Name the provinces of Canada. Name and locate the capital. The chief city. Its historic city.

38. What island at the mouth of the St. Lawrence ?

39. Does Iceland lie north or south of the Arctic circle ?

40. Which is the highest mountain peak of North America ?

41. Name the volcanoes in the United States and British America.

42. Describe the greatest river system of North America.

43. Fill out these blanks: Mexico contains about ..... inhabitants, descended from ..... Its climate is ..... Its surface is ..... The principal products are ... . The Government is ..... The chief cities are ....., located ..... The City of Mexico may be reached from New York by ..... The Territory of Mexico was much larger, but .....

44. What reason can you assign for the almost constant fogs on the banks of Newfoundland ?

45. Where is the deepest part of the Atlantic Ocean ?

46. Where the deepest part of the Pacific ?

47. Locate Miquelon and St. Pierre islands, and state to what country they belong.

48. Where does mahogany grow ?

49. What are icebergs, and how formed ?

50. For what is the Bay of Fundy noted ?

51. What is the ruler of Canada called ?

52. Name eight of the largest seas, gulfs, and bays that indent the coast of North America.

53. Name the three principal divisions of the West Indies.

54. Name the four Greater Antilles.

55. What two countries in Hayti? Name their capitals?

56. What is the capital of Cuba? Name and locate two other important cities on this island.

57. Name the capital of Jamaica. What other city on the island?

58. What is the capital of Porto Rico?

59. Name the principal productions of the West Indies.

60. Indicate the correct pronunciation of the following: Antilles, Appalachian, Manitoba, Jalapa, Newfoundland, Nueces, Cape Breton, Labrador, Oaxaca, Tehuantepec, Mazatlan, Hayti, Caribbean, Costa Rica, Frobisher, Belle Isle, Barbadoes.

NOTE.—One requisite demanded in teaching Geography today is the correct pronunciation of geographical names. Accordingly, we have placed after each division some of the names most frequently mispronounced.

UNITED STATES.

61. What parallel is the northern boundary of New York State?

62. On what parallel is the northern boundary of the United States?

63. Name the straits and rivers which connect the great lakes with one another and with the ocean.

64. Which is farther west—New Orleans or Lima?

65. Name in order of size the five largest cities of the United States.

66. What is the effect of the Japan current on the west coast of the United States?

67. What is the outlet of Lake Champlain?

68. For what is Lake George noted?

69. Name and locate the largest iron-manufacturing city in the United States.

70. What is the largest seaport?

71. What is the largest manufacturing city?

72. What city is the greatest grain market.

73. What city is the greatest cotton port?

74. Name the States of the Union, using their abbreviations.

75. Locate the Black Hills.

76. Name two important islands belonging to the State of New York.

77. Which State extends farthest north—Maine or Minnesota?

78. Where is Grand Island?

79. Locate Nantucket and Martha's Vineyard.

80. To what State do they belong?

81. What large bay forms the eastern part of Lake Huron?

82. What large bay on the west border of Lake Huron?

83. What is the population of the United States?

84. Name and locate five cities situated on the Great Lakes.

85. Name a State or section of the United States distinguished for (*a*) wheat; (*b*) cotton; (*c*) corn; (*d*) cattle; (*e*) sugar; (*f*) iron; (*g*) copper; (*h*) gold; (*i*) silver; (*j*) fruit.

86. Name and locate a city famous for the production or export of (*a*) sponges; (*b*) turpentine; (*c*) tobacco; (*d*) wheat; (*e*) ships.

87. Where is Harvard University? Yale College? Cornell University? Vassar College?

88. What States have the greatest population? The greatest area? The greatest mineral wealth?

89. How can one go from Chicago by water to the Gulf of St. Lawrence and the Gulf of Mexico?

90. What is the chief value of Alaska to the United States?

91. Why is the air warmer over the Gulf Stream than in other parts of the ocean?

92. How many rivers can you name that flow wholly between two States?

93. What is the Crescent City? The Hub? The City of Churches? The City of Elms? The Queen City of the Lakes? The Monumental City? The Smoky City? The City of the Straits?

94. What States were named after kings and queens?

95. How are the States of the Union represented on our flag?

96. For what is Mt. Desert Island noted?

97. Where are the Saddleback Mountains?

98. Name the two States whose northern boundary is just midway between the Equator and the North Pole.

99. Where are the pictured rocks?

100. What is the number of United States Senators?

101. What is the highest peak in the United States?

102. What State of the United States was once a republic?

103. In honor of whom was the District of Columbia named?

104. Locate the Staked Plain.

105. Why was the "Staked Plain" so called?

106. Give an account of the National Park.

107. Where is the centre of population?

108. Where are the Thousand Islands?

109. What is meant by the Dry Tortugas?

110. What valuable metals are found in the United States, and principally in what localities?

111. How does the area of the United States compare with that of Europe?

112. What proportion of the population are negroes and mulattoes?

113. Explain what is meant by Standard Time.

114. Indicate correctly the pronunciation of the following: St. Augustine; Cairo; Cheyenne; Katahdin; Los Angeles; Gila; Iowa; Kittatinny; New Orleans; Pernambuco; Sabine; San Diego; San Joaquin; San Jose; Sault St. Mary; Tucson; Wilkesbarre; Willamette; Louisiana; Utah; Terre Haute; Santa Fé; Arkansas; Hoboken; Louisville; Reading; Yosemite; Huron.

SOUTH AMERICA.

115. Draw an outline map of South America, using no construction-lines.

116. Describe the general features of the surface.

117. Why has South America no large rivers flowing into the Pacific Ocean?

118. Locate the island of Juan Fernandez.

119. State some fact which gives it special interest.

120. Name the capes which form the north, east, south, and west extremities of South America.

121. What is the general direction of the Isthmus of Panama?

122. What countries of South America does the equator cross?

123. Why are there rainless districts on the west coast of South America?

124. Along what three rivers are the principal lowland plains of South America?

125. Draw a diagram to show the Amazon and its five principal tributaries, writing upon each tributary its name.

126. What latitude has the mouth of the Amazon?

127. What is the length of the railroad across the Isthmus of Panama?

128. What ports are connected by this railroad?

129. What name is given to that arm of the ocean into which the Parana River empties?

130. What is the highest mountain peak of South America?

131. Describe the river system of South America.

132. Beginning on the eastern coast of South America, follow the equator around the globe and name in regular order the bodies of water, countries, and islands through which it passes.

133. Locate and describe the Pampas region. The Selvas. The Llanos.

134. Compare as to rainfall both slopes of the Andes in Northern Chili with those of Colombia and Ecuador.

135. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

136. If the Andes mountains were on the east side of South America, what effect would it have upon that continent?

137. Describe the marshes along the Amazon.

138. What large republic in South America?

139. What reasons can you assign for the slow progress of civilization in South America?

140. From what tree is quinine obtained?

141. In Caracas, what language is spoken? In Lima? In Rio Janeiro? In Valparaiso?

142. In what state of South America is the largest proportion of Europeans found?

143. Name the principal products of Brazil. Of the Guianas. Of Venezuela. Of the Argentine Confederation.

144. Indicate correctly the pronunciation of the following: Argentine; Bahia; Bogota; Cayenne; Guayaquil; Illimani; Llanos; Maracaybo; Para; Parana; Tapajos; Tocantins; Trinidad.

EUROPE.

145. What countries are comprised in the British Isles?

146. Draw an outline map of Europe, using no construction-lines.

147. Describe the general features of the surface of Europe.

148. How does the coast-line of Europe compare, in proportion to its area, with that of any other continent?

149. Describe the Rhine. The Rhone.

150. Where is the Golden Horn? Why so called?

151. Name the great rivers of Europe which rise in the Alps.

152. Name the mountain range extending through the whole length of Italy.

153. Name the peninsulas of Europe, the waters between which they lie, and the nations which occupy them.

154. Name ten of the chief exports of Great Britain.

155. On what river is the city of Rome?

156. Name and locate seven islands of the Mediterranean Sea.

157. Name the gulfs which open into the Baltic Sea.

158. How are the Baltic and North Seas connected?

159. Where is Oxford University?

160. Name the countries that touch the Mediterranean.

161. Name the republics of Europe.

162. What whirlpool off Norway?

163. What do you know of the Mt. Cenis tunnel?

164. How is the sea kept from overflowing Holland?

165. Where is the Giant's Causeway? Give a brief description of it.

166. What is remarkable about the rivers of Spain and Portugal?

167. Where is the Isle of Man? What are its inhabitants called?

168. Where is the Levant?

169. What city is called the Eternal City?

170. At what town in Europe is the sun seen in summer till midnight?

171. What is an avalanche?

172. Where is the Eddystone lighthouse?

173. What are the five powers of Europe? Name the ruler of each.

174. What are the inhabitants of Norway called? Of Denmark? Of Wales? Of Finland? Of Lapland?

175. What name is given to the ruler of Russia?

176. What can you say about Rome? About Venice? About Vesuvius? About Naples?

177. What do we find in the very high valleys of Switzerland instead of rivers?

178. To what country does Iceland belong?

179. What three noted volcanoes in the Mediterranean Sea?

180. Locate the great low plains of Europe.

181. Why has Great Britain a warmer climate than Labrador?

182. Why is the Rhine most swollen in the summer?

183. How is Copenhagen situated?

184. Indicate correctly the pronunciation of the following: Ajaccio, Alsace, Avon, Azov, Basle, Baireuth, Bordeaux, Bremen, Calais, Chamouny, Chelsea, Cherbourg, Edinburgh, Erzgebirge, St. Etienne, Genoa, Ghent, Gottingen. Greenwich, Hague, Herzegovina, Hesse Cassel, Interlachen, Lofoden, Madrid, Lisle, Marmora, Milan, Nijni-Novgorod, Lago Maggiore, Jungfrau, Jena, Nice, Neufchatel, Pesth, Pisa, Thames, Trieste, Tyrol, Vosges.

ASIA.

185. Draw an outline map of Asia, using no construction lines.

186. Describe the general features of the surface of Asia.

187. Name and locate the islands which comprise the Empire of Japan.

188. What two large islands south-east of Asia are crossed by the equator ?

189. Name ten seas bordering on Asia.

190. Locate Smyrna, and tell what its exports are.

191. What island south of Hindostan ?

192. By what waters is the peninsula of Hindostan embraced ? By what Arabia ? Corea ? Malay ? Kamtchatka ?

193. Locate Georgia, and tell for what it is noted.

194. Give some account of the Empire of China, and state (1) its area ; (2) its population ; (3) its form of government ; (4) its religion ; (5) the chief industries of the people.

195. For what purpose did the Chinese build the Great Wall ?

196. What can you say of its length ?

197. What is especially marked about the climate of Asia ?

198. What people are called the Celestials ?

199. To what government is the Holy Land now subject ?

200. Has the cutting of the Suez Canal had any influence upon Bombay ?

201. Why was the Dead Sea so named ?

202. Where is the most valuable pearl-fishery in the world ?

203. Indicate correctly the pronunciation of the following : Afghanistan, Altai, Beloochistan, Cashmere, Himalaya, Madras, Obi, Philippine, Tonquin, Yenisei, Yokohama.

AFRICA.

204. Draw an outline map of Africa, using no construction-lines.

205. Describe the general features of the surface of Africa.

206. Locate the island of St. Helena, and state some important fact that makes the island noted.

207. Is the greater part of Africa north or south of the equator?

208. Name the capes which form the north, east, south, and west extremities of Africa.

209. Is Liberia north or south of the equator?

210. Draw an outline map of Africa, and locate upon the map the great and small circles that cross the continent.

211. On what coast of Africa is Senegambia? Zulu Land? Natal?

212. What is the length of the Suez Canal?

213. What ports are connected by it?

214. What can you say of the passage down the Red Sea?

215. Who settled Cape Colony? About what time?

216. Name the most important discovery made by Stanley.

217. Name fifteen animals found in Africa.

218. Name the Barbary States. What do they export?

219. Name three groups of islands west of Northern Africa.

220. Why do travellers use camels in crossing the great desert. What is the camel often called?

221. Locate Mauritius. Why is it important?

222. For what is Cape Colony celebrated?

223. Where is the Nubian desert?

224. What can you say about rain in Egypt?

225. For what is the Nile remarkable?

226. To what country does Sierra Leone belong?

227. What can you say about Liberia?

228. Account for the dryness of northern Africa.

229. What is a mirage?

230. Indicate correctly the pronunciation of the following: Aguilar; Agulhas; Cairo; Natal; Said; Fayal.

OCEANICA.

231. Name the divisions of Oceanica.

232. In what hemisphere is Australia?

233. What two arms of the sea indent the coast of Australia?

234. Name the colonies of Australia.

235. What can you say of the surface and rivers of Australia?

236. What minerals abound in Australia?

237. Locate the four largest cities of Australia.

238. Name two of the Sandwich Islands.

239. Which is the larger?

240. Upon which is Honolulu situated?

241. What islands nearly south of the Sandwich Islands?

242. How does the latitude of the Sandwich Islands and the Greater Antilles compare?

243. What is the boomerang? Where and how used?

244. What is interesting about Pitcairn's Island?

245. What can you say of Mauna Loa?

246. Indicate correctly the pronunciation of the following: Celebes; Hawaii; Oahu; Papua.

For Second Grade.

1. Name the States which have no sea-coast.
2. Which State has the least?
3. On what part of the globe is the point having zero latitude and zero longitude?
4. How can you determine by a map the position and direction of a water-shed?
5. Locate the Canary Islands; The Madeira. The Cape de Verd Islands.
6. Name the principal spices, and state where they grow.
7. In what general direction do two thirds of the mountain ranges of the globe extend and two thirds of the rivers flow?
8. Name the four longest river-basins of the globe.
9. A vessel was driven ashore in 23° north latitude and 80° west longitude from Greenwich; upon what island was she?
10. Name in their order of importance three of the leading empires. Three republics.
11. Name in their order the six powers of the globe possessing the greatest territory.
12. Can you mould each continent?
13. What is the largest fresh-water lake of the globe?
14. Which is the largest inland sea?
15. Where are the richest silver-mines in the world?
16. What sea or lake has its surface lower than the ocean?
17. Draw a diagram to show the river system of each continent.
18. Locate the Isthmus of Kraw. Name the isthmuses of the globe.
19. Compare the level of the Dead Sea with that of the ocean.

20. Locate the five volcanic districts of the world.

21. What are geysers? Locate the principal geyser regions of the world.

22. Locate the magnetic pole.

23. Locate the Sargasso Sea. What causes it?

24. The mouth of what river of South America is west of the Cape of Good Hope?

25. Locate the Great Barrier Reef.

26. What are dikes, and for what used?

27. Where would you go for prunes? Dates? Oranges? Sulphur? Tin? Platinum?

28. Name in order of size the three largest islands of the globe, not classing the continents as islands.

29. What fertile country lies below the level of the sea?

30. What is the longest mountain range in the world?

31. What is meant by the Oriental countries?

32. Distinguish between the Western Hemisphere and the Western Continent.

33. In what part of the world is traffic still carried on by caravans?

34. In what general direction do most peninsulas project?

35. Of what use are rivers? Mountains?

36. What is the highest northern latitude yet reached?

37. Locate the Great Salt Desert.

38. What rivers of the world have extensive delta formations?

39. What is an inland sea? Give an example.

40. What is a border sea? Give an example.

41. What effect have marine currents upon climate?

42. Name four great features of similarity between the eastern and western continents.

43. Name the five largest cities of the world in order of population.

ANSWERS TO GEOGRAPHY, THIRD GRADE.

1. The Equator is a great circle passing around the earth midway between the poles; the Tropics are two small circles passing around the earth, one $23\frac{1}{2}°$ north of the Equator called the Tropic of Cancer, the other $23\frac{1}{2}°$ south called the Tropic of Capricorn; the Polar Circles are two parallels, one $23\frac{1}{2}°$ from the North Pole called the Arctic Circle, the other $23\frac{1}{2}°$ from the South Pole called the Antarctic Circle.

2. Latitude is distance north or south from the Equator. Longitude is distance east or west from a chosen meridian called a prime meridian.

3. The Torrid Zone is 47° wide; the Temperate Zones are each 43° wide; the Frigid Zones are each 47° wide.

4. See any geography.

5. Meridian Circles are great circles passing through the poles and cutting the Equator at right angles. A Meridian is half of a meridian circle, and extends from pole to pole.

6. First, it has been circumnavigated; second, the topmasts of vessels coming in from sea are seen first; third, sunrise takes place later or earlier as we go west or east; fourth, the earth's shadow on the moon is always circular; fifth, from any elevation the horizon is equally depressed upon all sides.

7. Day and night.

8. They enable us to locate places upon the earth's surface and to determine the position of ships at sea.

9. The revolution of the earth around the sun, the earth's axis meanwhile pointing constantly in one direction.

10. A continent is one of the six grand divisions of land; an ocean is one of the great divisions of water into which the sea is divided by the position of the continents; a sea is a division of the ocean nearly enclosed by land; the Sea is the whole body of salt water surrounding the continents.

11. Asia, Africa, North America, South America, Europe, and Australia; Pacific, Atlantic, Indian, Antarctic, and Arctic.

12. $66\frac{1}{2}°$.

13. The cardinal points are *north, east. south*, and *west*, the semi-cardinal are those midway between these, namely, *north-east, south-east, north-west*, and *south-west.*

14. A tropical circle.

15. South.

16. All that part within the Antarctic Circle.

17. The inclination of the earth's axis (23½°) alternately deprives those portions of the earth within the Polar circles of the sun's rays a part of the year.

18. On the Tropic of Cancer.

19. They must have the same southern latitude that we have northern.

20. New York being east of St. Louis has noon earlier. A telegram travels faster than the sun, and it would therefore reach St. Louis first.

21. Owing to the oblate form of the earth, they differ slightly.

22. Yes, they are shorter on the Tropics than on the Equator.

23. 7,925.65 miles. The polar diameter is 26.48 miles shorter.

24. From Greenwich, near London.

25. Meridians.

26. The meridian of 20° west longitude.

27. Rotation is the motion on its axis; revolution, the motion in its orbit.

28. One half of the earth is lighted by the sun at one time and the other half is in darkness; the circle marking the boundary between these two is the circle of illumination.

29. The Ecliptic is a great circle whose plane coincides with that of the earth's orbit, and therefore intersects the plane of the equator at an angle of 23½°. It marks the apparent path of the vertical sun from tropic to tropic during the annual revolution of the earth.

30. The Equinoxes are those periods when the sun enters one of the equinoctial points, and the days and nights are equal. They occur on March 20th and Sept. 22d.

31. The Solstices are those points in the ecliptic when the sun is farthest from the equator north or south. The solstices occur on June 22d and Dec. 22d.

32. ———

33. The Pacific or Western Highland, which extends from the Arctic region to the Isthmus of Panama, and occupies nearly all of the western half of North America; the Atlantic or Eastern Highland reaching from Labrador nearly to the Gulf of Mexico; the Atlantic plain, a strip of low land between the Appalachian Mountains and the Atlantic Ocean; and the Central Plain which lies between the two highland regions.

34. Labrador and New Foundland.

35. The climate of British Columbia is affected by the warm Japan current which passes from Alaska down the Pacific coast.

36. It is the narrow part of Mexico between the Bay of Campeachy and the Gulf of Tehuantepec.

37. The Provinces of Canada are Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, British Co-

lumbia, the District of Keewatin, together with the Northwest Territories. Ottawa, on the Ottawa River—Montreal—Quebec.

38. Anticosti Island.

39. South.

40. Mt. St. Elias.

41. Mt. St. Elias, Mt. Hood, Mt. St. Helens.

42. The Mississippi and its branches, forming the most extensive system of navigable rivers in the world.

43. Mexico contains about 10,000,000 inhabitants, descended from the early Spanish settlers. Its climate is hot, moist, and unhealthful on the coast; it is that of perpetual spring on the tablelands, and it is cold on the high mountains. Its surface is mostly a high plateau, having on its margin two mountain ranges extending from northwest to south-east. The principal products are silver, coffee, vanilla, cochineal, mahogany. The government is a federal republic. The chief cities are Mexico, the capital, located in the southern central part; Vera Cruz, on the Bay of Campeachy; Acapulco, on the Pacific; and Guadalaxara, in the western part, near the Santiago River. By steamer to Vera Cruz, thence by rail. But Texas, once a part, became independent in 1836, and California, New Mexico, and Arizona were ceded to the United States in 1848.

44. The air over the warm water of the Gulf Stream becomes saturated with moisture. The wind bears the moisture across the cold surface of the Polar current, causing these fogs.

45. About 100 miles north of the Island of St. Thomas, where it is more than 5 miles deep.

46. Between the Japan and the Admiralty islands, where it is a little more than 5 miles deep.

47. South of New Foundland. To France.

48. In Central America, Mexico, and the West Indies.

49. Icebergs are floating masses of ice. They break off from glaciers in the Arctic regions as the glaciers push into the sea.

50. For its high tides, which often rise seventy feet at the head of the bay.

51. The Governor-General.

52. Hudson Bay, James Bay, Gulf of St. Lawrence, Gulf of Mexico, Bay of Campeachy, Caribbean Sea, Bay of Honduras, and Gulf of California.

53. The Greater Antilles, the Lesser Antilles, and the Bahamas.

54. Cuba, Hayti, Jamaica, and Porto Rico.

55. Hayti and San Domingo—Port au Prince and San Domingo.

56. Havana—Matanzas, in the northern part, on Florida Strait; Santiago de Cuba, in the south-eastern part, on the Caribbean Sea.

57. Kingston—Falmouth.

58. San Juan.

59 Sugar, molasses, rum, tobacco, cotton, coffee, cacao, indigo, dye-stuffs, ginger, allspice, and fruits.

60. (Ăn-teel'.) (Ap-pa-lā'chĭ an.) (Man-i-to bah'.) (Hä-lä'pä.) (Nu fund-land.) (Nwā'sĕs.) (Cape Brit't'n) (Lab-ra-dōr'.) (Wä-hä kä.) (Tā-wän-tā-pek'.) (Maz-ăt-lan'.) (Hā tī.) (Căr ib-be'an.) (Kos-tä-reek'a.) (Frob'ish-ĕr.) (Bel-tl'.) (Bar-bā'doz.)

61. 45°.

62. 49°.

63. St. Mary River, Strait of Mackinaw, St. Clair River, Detroit River, Niagara River, St. Lawrence River.

64. New Orleans.

65. New York, Chicago, Philadelphia, Brooklyn, St. Louis.

66. It makes the climate milder.

67. Richelieu River.

68. For its beautiful scenery and the clearness of its waters.

69. Pittsburg, in the western part of Pennsylvania, at the juncture of the Alleghany and Monongahela rivers.

70. New York.

71. New York.

72. Chicago.

73. New Orleans.

74. Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Penn., Del., Md., Va., W. Va., N. C., S. C., Ga., Fla., Ala , Miss., La., Tex., O., Ind., Ill., Mich., Wis., Minn., Io., Mo., Ark., Ky., Tenn., Neb., Kan., Col., Nev., Cal., Ore., Id., Mont., S. Dak., N. Dak., Wash., Wy.

75. In the south-western part of South Dakota.

76. Long Island and Staten Island.

77. Minnesota.

78. In the Niagara River.

79. South-east of Massachusetts.

80. To Massachusetts. 81. Georgian Bay. 82. Saginaw Bay.

83. Census of 1890, 62,622,750, exclusive of Ind. Ter., Alaska, and Indians on reservations.

84. Milwaukee, eastern part of Wisconsin, on Lake Michigan; Chicago, north-eastern part of Illinois, on Lake Michigan; Detroit; eastern part of Michigan, on Detroit River; Cleveland, northern part of Ohio, on Lake Erie; Buffalo, western part of New York, on Lake Erie.

85. For wheat, the Central States; cotton, Mississippi, Georgia, Alabama; corn, the Central States; cattle, the Central States; sugar, Louisiana; iron, Pennsylvania and West Virginia; copper, Michigan; gold, California; silver, Nevada; fruit, Florida.

86. Sponges, Key West, in the southern part of Florida; turpentine, Wilmington, in the southern part of North Carolina; tobacco, Richmond, in the eastern part of Virginia; wheat, Chicago, in the north-eastern part of Illinois; ships, Portland, in the southern part of Maine.

87. At Cambridge, Mass.; New Haven, Conn.; Ithaca, N. Y.; Poughkeepsie, N. Y.

88. New York, Pennsylvania, and Illinois. Texas, California, and Montana. California and Nevada.

89. To the Gulf of St. Lawrence, by the Great Lakes and St. Lawrence River. To the Gulf of Mexico, by canal to Illinois River, thence by the Mississippi.

90. It has extensive salmon, cod, and herring fisheries. Its seal-fishery is the most valuable in the world.

91. The Gulf Stream is about 15° in summer and 30° in winter, warmer than other parts of the ocean. This condition makes the air above the Gulf Stream warmer.

92. Savannah; St. Mary's; Potomac.

93. New Orleans; Boston; Brooklyn; New Haven; Buffalo; Baltimore; Pittsburg; Detroit.

94. Virginia, Maryland, New York, The Carolinas, Louisiana, Georgia.

95. Each State is represented by a white star.

96. It is a noted summer resort.

97. In the western part of Maine.

98. New York and Vermont.

99. In the northern part of Michigan.

100. There are 88 senators.

101. Mt. Whitney, 14,887 ft.

102. Texas.

103. Columbus.

104. In the western part of Texas and the eastern part of New Mexico.

105. This plain is so called from the stakes once set up to show the trail from Santa Fé to the Mississippi.

106. It lies at the north west corner of Wyoming, and is a section nearly the size of Connecticut, set apart by Congress as a perpetual reservation for the benefit and instruction of mankind. It contains ten thousand boiling springs and geysers, many grand waterfalls, deep cañons, beautiful lakes, and rugged mountain peaks.

107. By census of 1890, 20 miles east of Columbus, Ind.

108. In the St. Lawrence River, north of New York.

109. The south-western islets of the Florida Keys. They are of coral formation, low, and generally barren.

110. Gold and silver in the Pacific Highland; coal and iron in

Pennsylvania and the Central States; copper in Michigan and New Mexico; lead in Missouri, Wisconsin, and Illinois.

111. It is nearly equal to that of Europe.

112. Nearly one eighth.

113. It is a method adopted by the railways of United States and Canada for securing a uniform standard of time. The United States is divided into four sections, and at all places in the same section time is the same. The first section keeps Eastern time, which is that of the 75th meridian; the second section keeps Central time, or that of the 90th meridian; the third section keeps Mountain time, or that of the 105th meridian; the fourth section keeps Pacific time, or that of the 120th meridian.

114. (Sent Aw'gus-teen.) Cāi'ro. (Shī-en'.) Ka tah'din. (Lō'ce An'jel-ez.) (He'lā.) I'o-wa. Kit-ta-tin'ny. New Or'le-ans. (Pĕr-năm-boo'ko.) (Sa-been'.) (Sän-de-ā'go.) (Sän Hwā-keen'.) (Sän Ho-sā.) Soo St. Mā'ry. (Tu-son'.) (Wĭlks'bär rĭ.) (Wil-la'met.) (Loo-i-ze-ā'na.) (Yoo'tä.) (Tĕr rĕh-hōt.) (Sän'tä-fā.) Ar-kan'sas. Ho'bō-ken. (Loo'is-vil.) (Rĕd'ing.) Yo-sem'i-te. Hu'ron.

115. ———

116. The surface of South America consists of the Andes region, extending through the entire western part; the Atlantic Highland of Brazil and Guiana; and a central plain comprising the Llanos, the Selvas, and the Pampas.

117. The slope from the Andes toward the Pacific is very short, while the long slope of South America is toward the Atlantic.

118. In the Pacific Ocean, west of Chili.

119. It was the solitary residence of Alexander Selkirk, whose story is often associated with that of the hero of "Robinson Crusoe."

120. Cape Gallinas, Cape St. Roque, Cape Horn, and Cape Blanco.

121. Easterly.

122. Brazil, Ecuador, United States of Colombia.

123. In passing the Andes south of the equator the trade-winds from the East are deprived of their moisture, and hence cause on the Pacific side a long stretch of rainless coast.

124. Orinoco, Amazon, and La Plata.

125. ———

126. Zero latitude.

127. 47½ miles.

128. Panama and Aspinwall.

129. Rio de la Plata.

130. Illampu.

131. The river system of South America is the most extensive on the globe, and includes the Orinoco, the Amazon, and the La Plata, with their branches.

132. Brazil, United States of Colombia, Ecuador, Pacific Ocean, Galapagos Islands, Gilbert Islands, Spice Islands, Celebes, Borneo, Sumatra, Indian Ocean, Zanguebar, Congo State, Lower Guinea, Atlantic Ocean.

133. The Pampas are the plains of the La Plata in Argentine Republic, and are covered with tall grass; the Selvas are the plains of the Amazon, and are covered with dense forests; the Llanos are the plains of the Orinoco, in the northern part of South America, and are treeless.

134. In Colombia and Ecuador, on both slopes of the Andes, there are abundant rainfalls; but the western slope in Northern Chili is entirely rainless.

135. On the Great Central Plain which extends along the eastern base of the Andes there are heavy rainfalls, due to the tropical rain-belt and the trade winds which sweep from the Atlantic. About one half of the western coast is a dry desert, because in passing over the Andes south of the equator the trade-winds are deprived of their moisture; but Patagonia receives a copious rainfall, caused by the counter trade-winds of the Pacific.

136. The long rivers would flow into the Pacific. The narrow rainless district west of the Andes would stretch across the continent to the foot of the mountains. There would be a heavy rainfall on the supposed Atlantic slope, caused by the mountains precipitating the moisture of the easterly trade-winds.

137. The marshes of the Amazon are the vast tracts that are overflowed by the periodical inundations of the river.

138. Brazil.

139. Because of the mixed population. Among the masses education is little diffused. In the republics, political revolutions have been very frequent, and means of interior communication are extremely rude.

140. From the cinchona tree.

141. Spanish; Spanish; Portuguese; Spanish.

142. Chili.

143. Coffee, cotton, sugar, hides, dye-woods, India-rubber, and diamonds. Indigo, cocoa, sugar, coffee. Coffee, cocoa, and other tropical products. Hides and wool.

144. Ar′ĝen-tīne. (Bā e′ä.) Bo go-tä′. (Kī-en′.) (Gwī-ä-keel′.) (Eel-yä-mä′nee.) (Lyä′nōs.) (Mä-rä-kī′bo.) (Pä-rä′.) Pä-rä-nä′. (Tä-pä′zhōs.) (To kan-teens′.) Trin-ĭ dad′.

145. England, Scotland, Wales, and Ireland.

146. ———

147. Eastern Europe is a plain extending from the Arctic Ocean to the Caucasus Mountains and the Black Sea, and westward from the Ural Mountains to the Bay of Biscay. The White, the Caspian, the Black, and the North seas break into the borders of the

plain. The rivers of this plain are the longest in Europe; the northern part contains many lakes. Highland Europe in the southwest is a network of mountain chains with enclosed valleys. The only large plateau is Spain. The Alps form the principal watershed of Highland Europe.

148. It is greater.

149. The Rhine rises in the Bernese Alps in Switzerland, flows in a northwesterly direction through Germany and Holland, emptying into the North Sea. The Rhone rises in the Bernese Alps in Switzerland, flows westerly and southerly through eastern France, emptying into the Gulf of Lyons.

150. The Golden Horn is the harbor of Constantinople. The wealth of the commerce of Byzantium (the site of which is now occupied by Constantinople) procured for its harbor this name.

151. The Rhine, Rhone, and Po.

152. The Apennines.

153. The Scandinavian, between the Arctic and Atlantic oceans and the Baltic Sea and Gulf of Bothnia, occupied by the Swedes and Norwegians. The Iberian, between the Atlantic Ocean and the Mediterranean Sea, occupied by the Spanish and Portuguese. Jutland, between the Baltic and the North seas, occupied by the Danes. Italy between the Mediterranean and the Adriatic seas, occupied by the Italians. Greece, between the Mediterranean and Ægean seas, occupied by the Greeks. Crimea, between the Black Sea and the Sea of Azov, occupied by Russians. Lapland, between Arctic Ocean and the White Sea; its inhabitants are Lapps.

154. Coal, iron, cotton goods, engines, machinery, hardware, glassware, linen goods, thread.

155. The Tiber.

156. Majorca, east of Spain; Corsica and Sardinia, west of Italy; Sicily, south of Italy; Malta south of Sicily; Candia or Crete, south of Greece; and Cyprus, in the extreme eastern part of the Mediterranean.

157. Gulfs of Bothnia, Finland, Riga, and Dantzic.

158. By Skager Rack and Cattegat channels.

159. At Oxford, England.

160. Spain, France, Italy, Turkey, Greece.

161. France and Switzerland.

162. The Maelstrom.

163. Mont Cenis Tunnel leads from France into Italy. It is about 8 miles long, and a railroad passes through it. The tunnel is 16 miles from Mont Cenis.

164. By embankments called dykes.

165. The Giant's Causeway is a platform of basaltic formation, projecting into the sea from the northern coast of Ireland. It re

sembles a pier; is about 700 feet long, 350 feet broad, and is 30 feet in height above the strand.

166. They are not navigable.

167. In the Irish Sea west of England. Manx.

168. The countries bordering the eastern shore of the Mediterranean constitute the Levant.

169. Rome.

170. Hammerfest.

171. A large mass of snow and ice which slides down the side of a mountain.

172. Off the south-western coast of England, opposite Plymouth.

173. Great Britain, Russia, Germany, France, and Austro-Hungary. The rulers of each are Queen Victoria, Czar Alexander III., Emperor William II., President Carnot, Emperor Franz Joseph.

174. Norwegians; Danes; Welsh; Finns; Lapps.

175. The Czar.

176. Rome is the most celebrated city in history, and is the residence of the Pope, who is the head of the Roman Catholic Church. Every part of Rome contains magnificent ruins, ancient sculpture, and paintings. The splendor of its churches is unparalleled—the Church of St. Peter's being the finest building in the world. Venice is built upon 100 small islands, and canals take the place of streets. Vesuvius is a volcano situated near the Bay of Naples. Its eruption in the year 79 buried the city of Pompeii. Naples is the largest city of Italy. It is beautifully situated on the Bay of Naples, and is noted for the manufacture of silk.

177. Glaciers.

178. To Denmark.

179. Etna, Vesuvius, Stromboli.

180. In the north-western and northern parts.

181. The warm south-west or return trade-winds bring with them a part of the heat they have acquired in the Torrid Zone; the warm waters of the Gulf Stream also assist in modifying the climate of Great Britain.

182. Because the glaciers of the Alps melt more rapidly in summer than in winter.

183. In the eastern part of Denmark, on the Island of Zealand.

184. (Ä-yät'cho.) (Äl-säss'.) (Eng.) (Ā'vǫn.) French (Ä-vōn'.) (Az'of.) (Bahl.) (Bī'ruth.) (Bor-dō'.) (Brā'mẹn.) (Kä'lā'.) (Shä-moo-ne'.) (Chel'se.) (Sher'burg.) (Ed'in-bur-ruh.) (Erts-gą-beer'gą.) (Sent-et-e-en'.) (Gen'o-a. (Gent.) (Get'ting-ẹn.) (Grīn'īj.) (Haig.) (Hĕrt-seh-go-vee'nä.) (Hessę Cas'sęl. (In'ter-läk-en.) (Lof-fo'den. Mad-rid'. (Leel') Mar'mọ-rą Mĭl'an. (Nizh'nee.) Nov-go-rod'. (Lä'go-măd jo'rā.) (Yoong'frow.) Jen'a. (Nees.) (Nush-ä-tel'.) (Pest.) (Pee'sä.) (Tĕmz.) (Tre-ĕst'.) Tyr'ol. (Vōzh.)

185. ———

186. The surface is divided into three parts, Lowland Asia, Highland Asia, and the southern peninsulas. Lowland Asia occupies the great plain of Siberia and Turkestan. Highland Asia includes the vast region between Lowland Asia and the peninsulas, and extends from the plateau of Arabia to Kamtchatka. In Highland Asia are found the most elevated plateaus and the loftiest mountain chains upon the globe.

187. Hondo, Yezo, Shikoku, Kiushiu, the Loo Choo, and the Kurile islands.

188. Sumatra and Borneo.

189. Behring, Okhotsk, Japan, Yellow, China, Arabian, Red, Mediterranean, Black, Caspian.

190. Smyrna is in the western part of Turkey, on the Ægean Sea. Its exports are figs and other dried fruits.

191. Ceylon.

192. By the Bay of Bengal, the Arabian Sea, and the Indian Ocean. By the Persian Gulf and the Arabian Sea, and the Red Sea. By the Japan and the Yellow Sea. By the China Sea, the Bay of Bengal, the Gulf of Siam, and the Strait of Malacca. By the Behring and the Okhotsk Seas.

193. Georgia is north-east of Turkey. Its women are especially noted for their beauty.

194. The territory of the Empire of China is larger than the whole of Europe. Its population is 400,000,000. Its government is an absolute and despotic monarchy; its religion is Buddhism; its leading industries are agriculture and manufactures.

195. To keep the Mongol Tartars out of China.

196. It is more than 1200 miles long.

197. It is subject to great extremes of heat and cold.

198. The Chinese.

199. To the government of Turkey.

200. The Suez Canal has greatly increased the commercial importance of Bombay, making it rival Calcutta.

201. The Dead Sea was so named because its waters are fatal to animal life.

202. On Bahrein Island, near the Strait of Ormus.

203. (Äf-gän-is-tän′.) (Äl-tī′.) Bel-loo-chis-tän′. (Kash-meer′.) Him-a-lā′yą. Mad-ras′. (Ō′bē.) Phil′ip-pĭne. (Ton-keen′.) (Yen-e-sā′e.) (Yo-ko-hah′ma.)

204. ———

205. Nearly all the surface consists of broad low plateaus; the edges of the continent are partly bordered and its surface broken by short mountain ranges.

206. It is in the Atlantic Ocean, west of Africa. Napoleon Bonaparte was banished to this island, where he died.

207. North.

208. Bon, Guardafui, Agulhas, and Verde.

209. North.

210. ———

211. The west coast. South-eastern. South-eastern.

212. About 100 miles.

213. Port Said and Suez.

214. The passage down the Red Sea is intensely hot, particularly in the summer months. Sometimes it is necessary to put the ship about and steer in an opposite direction to afford temporary relief from the heat.

215. Cape Colony was first settled by the Dutch at Cape Town in 1652. It was captured by the British in the early part of this century, to whom it was soon after formally ceded.

216. His exploration of the whole course of the Congo River, hitherto unknown.

217. The elephant, rhinoceros, hippopotamus, camel, giraffe, chimpanzee, gorilla, mandrill, crocodiles, gnu, zebra, lion, panther, leopard, ostrich, sacred ibis, horned viper, hyena, antelopes, buffalo.

218. Morocco, Algeria, Tunis, Tripoli, and Barca. They export wool, goat-skins, leather, gum, wax, olive-oil, dates, and almonds.

219. The Madeira, the Canary, and the Cape Verde islands.

220. It is a beast of burden ; its milk is used for food ; and it is the only animal that can eat the coarse herbage of the desert, and pass many days without water. "The Ship of the Desert."

221. Mauritius is east of Madagascar. It is a stopping-place for vessels crossing the Indian Ocean.

222. Cape Colony is a British colony of considerable importance. Ostrich-farming is extensively carried on there.

223. The Nubian desert is in the north-eastern part of Africa, in Egyptian territory.

224. On the coast of the Mediterranean rain is frequent, but in other parts of Egypt it rarely falls.

225. It overflows its banks from June to December. For three months the water rises slowly and then slowly subsides. As it subsides, the muddy water leaves a thin layer of fertilizing sediment over all the land, and thus annually renews the productiveness of the soil.

226. To Great Britain.

227. Liberia was originally founded by the United States for its free negroes and emancipated slaves. It was made an independent negro republic in 1848.

228. The dry sandy soil is raised to an intense heat during the day, and there is little or no water to evaporate. The hot dry air ascends, but the winds which blow in upon the desert cannot deposit

any moisture; for, instead of being cooled, they are heated and driven up in the ascending currents.

229. A mirage is an optical illusion arising from certain conditions of the atmosphere. It causes remote objects to be seen double, or to appear as if suspended in the air. It is frequently seen in deserts, presenting the appearance of water.

230. (Ä-ḡe-lar′.) (Ä-gool′yäs.) Caï′ro. Nä-täl′. (Sä-eed′.) (Fi-awl′.)

OCEANICA.

231. The Malay Archipelago, Australasia, Melanesia, and Polynesia.

232. In the Eastern Hemisphere.

233. Great Australian Bight and Gulf of Carpentaria.

234. North Australia, South Australia, Western Australia, Alexandra Land, Queensland, New South Wales, and Victoria.

235. Australia is two thirds as large as the United States; the interior, mostly unexplored, is a low plateau, a considerable part of it being a desert. The rivers are few; the most important being the Murray and its tributaries.

236. Gold, copper, iron, and coal.

237. Melbourne, in the southern part of Victoria; Sydney, in the eastern part of New South Wales; Adelaide, in the southern part of South Australia; and Brisbane, in the eastern part of Queensland.

238. Hawaii, Maui.

239. Hawaii.

240. Oahu.

241. The Society Islands.

242. They have the same latitude.

243. The boomerang is an instrument used in war and the chase by the aborigines of Australia. It is about two feet long, made of hard wood, bent in the form of an obtuse angle; is flat on one side and rounded on the other. It is thrown forward as if to hit some object, but after going forward it reverses its motion, and sweeps over the head of the thrower, striking the intended object behind him.

244. Pitcairn's Island, two and one quarter miles long and one mile wide, is in the Pacific Ocean, in 25° south latitude and 130° west longitude. It is surrounded by cliffs, making it impossible to land except in two or three spots. The climate is healthy. Tropical fruits grow there, and the soil is fertile. Its inhabitants are descended from an English crew that mutinied, and Tahitian women whom they brought to the island.

245. Mauna Loa, a volcano in one of the Sandwich Islands, has the largest crater in the world.

246. (Sel′e-biz.) (Hä-wï′ee.) (Wäh′hoo.) (Pap′oo-ą.)

ANSWERS TO GEOGRAPHY, SECOND GRADE.

1. Vt., Penn., W. Va , Tenn., Ken., Ohio, Mich., Wis., Ind., Ill., Ark., Mo., Iowa, Minn., Neb., Kan., Col., Nev., Idaho, Mont., S. Dak., N. Dak., Wash., Wy.

2. New Hampshire.

3. Where the prime meridian crosses the equator.

4. By the position and direction of the mountains, and also by finding the line of land from which rivers flow in opposite directions.

5. North-west of Africa. North of the Canary Islands. West of Africa.

6. Pepper, from Sumatra, Java, Borneo, Singapore; ginger, from Hindostan, West Indies: allspice, from West Indies, Mexico, and parts of South America; cinnamon, from Ceylon, Java; cloves, nutmegs and mace, from the Moluccas.

7. North and south.

8. Amazon, Mississippi, Yenisei, and Nile.

9. Cuba.

10. Great Britain, Germany, Russia. United States, France, and Brazil.

11. The British Empire, the Russian Empire, the Chinese Empire, United States, Brazil, and the Turkish Empire.

12. ——— 13. Lake Superior.

14. Caspian Sea.

15. In Nevada.

16. The Caspian Sea.

17. ———

18. Between Indo-China and Malay Peninsula. Isthmus of Suez, Panama, Tehuantepec.

19. The surface is over 1200 feet below the level of the Mediterranean.

20. The volcanoes of the Andes. Those of Central America, Mexico, and the Lesser Antilles. Those of the Rocky Mountains and Aleutian Islands. Those of Kamtchatka, the Kurile Islands, and Japan. Those of Sumatra, Java, and thence to New Guinea

21. A geyser is a boiling spring whose waters burst out at intervals with great force. In the basin of the Upper Yellowstone, in Iceland, and in New Zealand.

22. The magnetic pole is in latitude 70° in the western part of Boothia Island.

23. The Sargasso Sea is in the Atlantic Ocean, near the Tropic of

Cancer. It is an immense field covering thousands of square miles, undisturbed by ocean currents and covered with sea-weed.

24. The La Plata River.

25. The Great Barrier Reef is north-east of Australia.

26. A dike is an embankment built to keep the sea from overflowing the land at high tide.

27. To France and Turkey for prunes; to the Barbary States for dates; to Sicily for oranges and sulphur; to England for tin; to Russia for the chief supply of platinum.

28. Greenland, Borneo, and Madagascar.

29. Holland.

30. The Rocky and the Andes together form the longest mountain range in the world.

31. Egypt and the southern countries of Asia, including China and Japan.

32. The western hemisphere is that part of the globe between 20° west and 160° east longitude. The western continent is North America and South America.

33. Across the southern part of Asia.

34. Southerly.

35. Rivers furnish an easy communication between all parts of a country, and are useful for drainage. Mountains are the source of rivers; they form natural boundaries and affect climate.

36. About 83½°.

37. It is in the northern part of Persia.

38. The Mississippi, the Nile, Ganges, Niger, Danube, Volga, Irrawaddy, Indus, Orinoco.

39. An inland sea is one that has no outlet, as the Caspian, Aral.

40. A border sea is one that is connected with the ocean, as the Caribbean.

41. The north-polar currents are, by the influence of the earth's rotation, thrown upon the eastern shores of the continents, thus reducing their temperature below that belonging to the latitudes, and the return currents carrying the warm water strike the western shores of the continents and raise their temperature above that belonging to the latitudes.

42. Each is invaded nearly midway by the ocean or great inland seas; each of the grand divisions is more or less triangular in shape; the northern grand divisions of each are more deeply indented with gulfs, bays, and seas; each of the northern grand divisions have many peninsulas, while the reverse is true of the southern grand divisions.

43. London, Hankow, Paris, Canton, Berlin. The reports of population of Chinese cities are not to be relied on.

CHAPTER III.

HISTORY OF THE UNITED STATES.

For Third Grade.

ABORIGINAL PERIOD.

1. Who were the Mound-builders?
2. Make a diagram of the shapes of the mounds.
3. What arts did the Mound-builders understand?
4. Where has one of their mines been discovered? Describe it.

PERIOD OF VOYAGE AND DISCOVERY.

5. Give a short sketch of the life of Columbus.
6. Give an account of his discovery of America.
7. How many voyages did he make after the first?
8. Give the result of each voyage.
9. Who were the Cabots, and what discoveries did they make?
10. Give an account of Vespucci's voyage.
11. Who was De Leon, and how is his name connected with the new world?
12. What discoveries did Verrazzani make?
13. When and by whom was St. Augustine founded?
14. What do you know of the Round Tower at Newport, R. I.?
15. Tell what you can of Dighton Rock.
16. Why was the new world named after Americus Vespucius?

PERIOD OF SETTLEMENT.

17. Give an account of Cartier's attempt to colonize Canada.

18. Write a description of De Soto and his expedition.

19. Trace upon a map of the United States the route traversed by De Soto and his men.

20. What account can you give of Coligny and the Huguenots?

21. Where did Sir Humphrey Gilbert attempt to plant a colony?

22. What resulted from Sir Walter Raleigh's attempts to plant a colony?

23. Were there any other attempts to plant colonies?

24. What was the object of the London Company? Of the Plymouth Company?

25. Give an account of the settlement of Jamestown.

26. Write a short account of the exploits of Captain John Smith.

27. Give briefly the story of Pocahontas's life.

28. Relate the history of Hudson and his voyages.

29. When, by whom, and where was New York settled?

30. Give an account of the Pilgrims, their wanderings, and settlement in America.

31. What can you say of the introduction of slavery into the colonies?

32. Treat these topics:

(*a*) Settlement of the Colony of Boston and Massachusetts Bay.

(*b*) Settlement of Connecticut.

(*c*) Settlement of Maryland.

(*d*) Roger Williams and Rhode Island.

(*e*) Gorges and Mason and their grant of land.

(*f*) William Penn and the founding of Pennsylvania.

(*g*) The founding of New Jersey.

33. Give an account of the Pequod war.

34. Give a summary of the founding and settlement of Delaware. Of North Carolina. Of South Carolina. Of Georgia.

35. What inducements led Europeans to go to America?

36. What was the "starving time" in Virginia?

37. Tell of the condition of the settlers of Plymouth during their first winter.

38. What nations claimed America by right of discovery?

39. What names were given to the parts each claimed?

40. Locate these parts.

41. In what way did the settlers of Virginia obtain wives?

42. What form of religion first prevailed in the colony of Maryland?

43. Who founded Georgia?

PERIOD OF COLONIAL GROWTH.

44. Who was Anne Hutchinson, and what were her views?

45. Give an account of the persecution of the Quakers in Massachusetts.

46. Write a summary of King Philip's War.

47. Give the story of the Charter Oak.

48. Name the three wars that occurred prior to the French and Indian War.

49. Write an account of that strange delusion, the Salem Witchcraft.

50. What were the Patroons of the colony of New York?

51. Can you name the Dutch governors of New York?

52. Give an account of the easy conquest of New York by the English.

53. Can you tell when the following were founded, and

what causes led to their founding: Harvard College? William and Mary College? Yale College? Princeton College? Locate each.

54. Give an account of the explorations of Father Hennepin, Marquette, and La Salle.

55. What languages were spoken in New York in the latter part of the seventeenth century?

56. Describe the houses, dress of the people, and the church services of early New England.

THE FRENCH AND INDIAN WAR.

57. State fully the causes of the French and Indian War.

58. Give an account of Washington's mission to St. Pierre, the French commander.

59. Draw a line upon the map connecting the French forts.

60. Give an account of Washington's expedition against the French.

61. What four expeditions moved against the French in 1755?

62. What was the result of each expedition?

63. Write fully an account of Braddock's ill-fated expedition against Fort Du Quesne.

64. Name the defeats which make the years 1756 and 1757 years of disaster.

65. Give an account of Wolfe's campaign against Quebec.

66. When was the treaty of peace signed, and what were its terms?

67. What commanders were killed at Quebec?

THE REVOLUTION.

68. State the causes that led to the American Revolution.

69. What action did the Continental Congress of 1774 take?

70. Give an account and state the effects of the skirmishes of Lexington and Concord. Locate carefully these places upon the map.

71. Tell about the capture of Ticonderoga.

72. What action was taken by the Second Continental Congress of 1775?

73. Draw a map of the Charlestown peninsula, showing the redoubt of the Americans and the landing-place of the British, and give an account of the battle of Bunker Hill.

74. When did Washington take command of the army?

75. Give an account of the unsuccessful expedition against Canada.

76. What was the Boston Massacre?

77. Relate the story of the Spilling of the Tea.

78. What were the minute-men?

1776.

79. What were Washington's plans in forcing the British to evacuate Boston?

80. State the movements of Clinton, Lee, and Washington after the evacuation of Boston.

81. Why is the 4th of July, 1776, memorable?

82. Who were the Hessians?

83. Draw a plan and give an account of the battle of Long Island.

84. Describe the prisons and prison-ships in which the captured Americans were confined.

85. Trace upon the map Washington's movements from the battle of Long Island to the capture of the Hessians at Trenton, stating briefly the principal events.

1777.

86. What can you say about the agents of Congress in France?

87. Give an account of the battle of Princeton.

88. Give an account of the battle of Brandywine.

89. Describe Burgoyne's campaign, and state its results.

90. Give an account of the encampment of the American army during the winter of 1777 and 1778. Locate the spot on the map.

91. Where did Congress assemble while the British occupied Philadelphia?

1778.

92. With what nation was a treaty of alliance concluded?

93. In what way did England seek to negotiate with the colonies early in this year?

94. Why were the negotiations refused?

95. Give an account of the evacution of Philadelphia and the battle of Monmouth.

96. What heroic task was performed by a woman at the battle of Monmouth?

1779.

97. Why were troops sent to the South in this year?

98. Describe the capture of Stony Point.

99. Name the engagements fought in the South during this year.

100. Who was John Paul Jones?

1780.

101. What was the design of the British in seizing Charleston?

102. Name the principal events which occurred in the South during this year.

103. Who were Marion and his men?

104. Write an account of Arnold's treason.

105. What did the French send this year?

1781-3.

106. Where was the battle of Cowpens fought, and who were victorious?

107. Describe the siege of Yorktown.

108. Tell of the military operations in the South before the surrender of Cornwallis.

109. Treat these topics: The Discontent in the Army; The Evacuation of New York; The terms of the Treaty of Peace; Washington resigning his commission.

110. In what condition were the colonies when the Revolutionary army disbanded?

111. What difficulties were experienced under "The Articles of Confederation"?

112. When was the present constitution adopted?

113. Name the thirteen colonies engaged in the Revolution.

PERIOD OF NATIONAL GROWTH.

WASHINGTON'S ADMINISTRATION.

114. Give a brief account of the inauguration of Washington and the organization of the new government.

115. Name the two political parties at this time.

116. State briefly the facts about the Whiskey Insurrection.

ADAMS'S ADMINISTRATION.

117. What troubles occurred with France in this administration?

118. What were the Alien and Sedition Laws?

119. Who said, "Millions for defence, not a cent for tribute," and why did he say it?

JEFFERSON'S ADMINISTRATION.

120. Give an account of the Louisiana purchase.

121. Bound the territory.

122. Write an account of Hamilton and Burr, and Burr's proposed Western Empire.

123. What was the Embargo?

124. Describe Fulton's steamboat.

125. What explorations were made by the Lewis and Clark's expedition?

MADISON'S ADMINISTRATION. THE WAR OF 1812.

126. What were the causes of the War of 1812?

127. Name the battles of this war fought along the Canadian frontier, including the naval battles upon the Lakes.

128. Name the most important naval engagements.

129. What stirring events occurred at and near Washington?

130. What Indian uprisings occurred, and who quelled them?

131. Give an account of the Hartford Convention.

132. Describe the battle of New Orleans.

133. When was the treaty of peace signed, and what were its terms?

134. What is of interest regarding the buccaneers of the Gulf of Mexico?

MONROE'S ADMINISTRATION.

135. What Indian disturbances arose in the South in Monroe's administration?

136. Treat the topic "The Missouri Compromise."

137. What were the two great parties at this time?

138. Define the Monroe Doctrine.

139. Describe La Fayette's visit to the United States.

JOHN QUINCY ADAMS'S ADMINISTRATION.

140. Describe the tariff enacted in 1828.

141. What great canal was finished in 1825?

142. Where was the first railroad built and operated?

143. What two Presidents died on the 4th of July of the nation's semi-centennial?

JACKSON'S ADMINISTRATION.

144. What practice was inaugurated by Jackson when he became President?

145. What attitude did Jackson assume toward the Bank of the United States?

146. What was the Seminole War?

147. What was the "surplus revenue"?

VAN BUREN'S ADMINISTRATION.

148. What were the causes of the Financial Crisis?

149. What can you tell of the government and the banks?

150. What was the Hard Cider Campaign?

151. What difference of views was there between the Whigs and the Democrats?

HARRISON AND TYLER'S ADMINISTRATION.

152. How long was President Harrison in office?

153. What bill was vetoed by Tyler against the policy of the party which elected him?

154. Give a short account of the difficulties in Rhode Island generally known as the Dorr rebellion.

155. What was settled by the Ashburton treaty?

156. Describe the annexation of Texas.

157. What were John C. Calhoun's reasons for the annexation?

158. Give an account of the first telegraph.

POLK'S ADMINISTRATION.

159. State the causes which led to the Mexican War.

160. What was the Wilmot Proviso?

161. How were the rival claims of the United States and Great Britain to Oregon settled?

162. Give an account of the Mormon difficulty.

163. Name five of the principal battles of the Mexican War, and state what is remarkable about all the battles of this war.

164. Name the territory ceded by treaty with Mexico to the United States.

165. What was the "gold fever"?

166. Who were the most noted commanders on both sides in the Mexican War?

TAYLOR AND FILLMORE'S ADMINISTRATION.

167. What was the Omnibus Bill?

168. What was the Fugitive Slave Law which Fillmore's administration supported?

169. Can you tell what great work, written by a lady of the North, was published shortly after the signing of the Fugitive Slave Law?

170. Tell of Perry's expedition to Japan, and what it accomplished.

PIERCE'S ADMINISTRATION.

171. What was the Kansas-Nebraska Bill, and how di the measure affect the people of Kansas?

172. Who were the Border Ruffians?

173. Describe the Gadsden Purchase.

174. Name the territory so acquired.

175. What was the Know-Nothing party?

BUCHANAN'S ADMINISTRATION.

176. Give an outline of the Dred Scott Decision.

177. What was John Brown's raid?

178. What noted American writer died during Buchanan's administration?

179. Who was Dr. Kane?

180. Who were the candidates for the Presidency in 1860?

181. State the causes that led to the Civil War.

182. What State first passed the ordinance of secession?

183. Name the other States that followed.

184. What position did the administration take with reference to the seizure of the forts and arsenals?

LINCOLN'S ADMINISTRATION. THE CIVIL WAR.

185. Describe the bombardment of Fort Sumter.

186. What States seceded in 1861?

187. Treat these topics: The attack upon the Massachusetts troops in Baltimore; The battle of Bull Run; The battle of Ball's Bluff, The state of affairs in Missouri.

188. Give an account of the capture of Mason and Slidell.

189. What was the attitude of England toward the United States?

1862.

190. Draw a map of the scene of operations in the Southwest, and, beginning with Belmont, describe the engagements in this section to the capture of Vicksburg.*

* Such a question covers more than one year, but such a plan of study will give a clear, connected, and durable impression of the main movements of the war. Of course the time should be kept firmly in mind, so that the student may be able to place accurately the bearing of any contemporary event.

191. Describe the engagement between the Monitor and the Merrimac.

192. Give and trace meantime upon the map an outline of the movements and engagements of the Army of the Potomac from their setting out from Washington, March, 1862, to capture Richmond, to their being driven toward the fortifications around Washington in September, 1862.

193. Give an account of Lee's invasion of Maryland, and the battles resulting therefrom.

194. Describe the guerrilla warfare in Kentucky in 1862.

195. Give an account of the disheartening battle of Fredericksburg in December of 1862.

196. Draw a picture of the Confederate flag.

1863.

197. Describe the capture of Vicksburg.

198. When was the Emancipation Proclamation issued, and what were its terms?

199. Give and trace meantime upon the map an account of the battle of Chancellorsville, Lee's second invasion of Maryland, and the battle of Gettysburg.

200. How did Admiral Dupont try to take Charleston?

201. Draw a map of Charleston harbor, locating its forts.

202. Give an account of the movements in Tennessee and the battle of Chickamauga.

203. Describe the battle of Lookout Mountain.

204. What were Morgan's raids?

205. Trace Sherman's route and engagements from his leaving Vicksburg in February, 1864, to his reaching the sea.

206. From here trace him north, and show how he cooperated with General Grant.

207. Describe the Red River Expedition.

208. Describe the capture of Mobile.

209. Draw a map and, marking the positions, give an account of General Grant's movements and the surrender of General Lee.

210. Describe Sheridan's movements in the Shenandoah Valley.

211. Give a short account of the Alabama and other privateers.

212. Who were the candidates for the Presidency in 1864? Who was elected?

213. Give an account of the assassination of Lincoln.

214. Can you give the debt of the United States at the close of the war?

JOHNSON'S ADMINISTRATION.

215. How was slavery abolished in the United States?

216. What was the Amnesty Proclamation?

217. What great territory was purchased in 1867, and what price was paid for it?

218. State carefully the attitude of President Johnson and of Congress with reference to public policy.

219. Why was the President impeached?

220. What was secured by the Fourteenth Amendment?

GRANT'S ADMINISTRATION.

221. Tell about the Atlantic cable and the Union Pacific Railroad.

222. What was secured by the Fifteenth Amendment?

223. State what the Alabama Claims were.

224. What noted man ran against Grant for the Presidency in 1872?

225. Which is the "Centennial State"?

226. Describe the Centennial Exhibition, and state the effect it had upon American industry.

227. What was the war with the Sioux?

228. Who were the candidates of the Republican and Democratic parties in the campaign of 1876?

229. What dispute arose about the election?

230. Did the Constitution make any provision for what had happened?

231. State carefully how the dispute was settled.

HAYES'S ADMINISTRATION.

232. Who was Secretary of State under Hayes?

233. What measures of conciliation did President Hayes adopt toward the South?

234. On what grounds did the President defend this against the criticism in some parts of the country?

235. Who were the Republican and the Democratic candidates for the Presidency in 1880?

GARFIELD AND ARTHUR'S ADMINISTRATION.

236. Write a short sketch of President Garfield's life.

237. Who was his Secretary of State?

238. Give an account of the assassination of President Garfield, and the sympathy shown by the people of the Old World.

239. What was the population of the United States in 1880?

240. Who were the candidates of the Republican and the Democratic parties in the national election of 1884?

241. What was characteristic of the campaign?

242. What is meant by Civil Service Reform?

243. Who were elected President and Vice-President?

CLEVELAND'S ADMINISTRATION.

244. Whom did President Cleveland select for Secretary of State?

245. What noted man died during the first year of this administration? Give a short sketch of his career.

246. What was the most marked feature of his funeral?

247. What other commander died during this year?

248. State the important events of Cleveland's administration.

249. What was the chief political issue in the campaign of 1888, and who were elected?

HARRISON'S ADMINISTRATION.

250. Whom did Harrison appoint his Secretary of State?

251. What was the Pan-American Congress and its object?

252. Where is Oklahoma and when opened?

253. What great disaster occurred in 1889?

254. Name the states admitted during this administration, and state which one allowed women to vote and hold office.

255. What noted statesman died in the latter part of Harrison's term?

256. What was the principal issue in the campaign of 1892, who were the candidates on either side, and who were elected?

257. What new party polled a large vote in the West? State briefly its principles.

CLEVELAND'S SECOND ADMINISTRATION.

258. Why was an extra session of Congress called in August, 1893, and with what results?

259. What was the Columbian Fair? How did it compare with previous World's Fairs?

260. Give an account of the industrial depression and of the Wilson Bill.

261. Give an account of our relations with the Hawaiian Islands during this administration.

262. What was the Venezuelan boundary dispute?

263. Give a short account of the election of 1896.

M'KINLEY'S ADMINISTRATION.

264. What was the first important act of Mr. McKinley's administration?

265. What effect followed the enactment of the Dingley tariff law?

SPANISH-AMERICAN WAR.

266. Give an account of the condition of affairs in Cuba just before the Spanish-American War, and state why President McKinley was obliged to deal with them.

267. Give an account of the destruction of the *Maine*, and state what effects it had upon the relations between the government of Spain and that of the United States.

268. When was war declared, and on what grounds?

269. Give an account of the first engagement of the war.

270. Give an account of the invasion of Cuba by the United States army, and tell how the army was assisted by the naval forces.

271. Give an account of the gallant exploit of Lieutenant Hobson, stating what he had in view.

272. Give an account of the great naval battle off Santiago.

273. When was Hawaii annexed to the United States, and what condition of affairs brought this about?

274. Give an account of the expedition sent to the Philippine Islands to co-operate with Admiral Dewey.

275. Give an account of the invasion of Porto Rico.

276. When did Spain agree to the terms of the protocol, and what were those terms?

277. What battle was fought after the signing of the protocol, and with what results?

For Second Grade.

ABORIGINAL PERIOD.

1. Name the great Indian families that once occupied the present territory of the United States, and tell in what part of the country each family was found.

2. To what family did each of the following tribes or nations belong: Mohegans? Creeks and Seminoles? The Powhatan Confederacy? The Sacs and Foxes? The Sioux? The Mohawks?

3. Give an account of the religion, government, and habits of life of the Indian.

4. What can you say of the mammoth and the mastodon?

5. Who are the Pueblo Indians, and for what noted?

6. Name two very ingenious Indian inventions.

PERIOD OF VOYAGE AND DISCOVERY.

7. Name the four Icelandic discoverers of America, and give an account of their supposed voyages.

8. What part of the country did they name Vineland?

9. When and where was the first colony planted, who was governor, and what great discovery did he make?

10. What account can you give of Cortez's conquest of Mexico?

11. Give an account of Pizarro's conquest of Peru.

12. What was accomplished by Sir Francis Drake during these years of discovery?

13. Can you give the Spanish, the Indian, and the English name of the island where Columbus first landed, and point it out on the map?

14. How many times has Columbus been buried? Where does his body now rest?

PERIOD OF SETTLEMENT.

15. Give an account of Champlain's explorations and his zeal in behalf of the Jesuit missionaries.

16. What was the House of Burgesses?

17. Where was the first white child of English parents born in America?

18. What was the character of the first colonists at Jamestown?

19. What settlers of Massachusetts were Pilgrims and what Puritans?

20. How is the name of "The Speedwell" connected with the settlement of the Pilgrims?

21. What was the Dutch West India Company?

22. To what was the name Rhode Island and Providence Plantations given?

23. How is George Fox, the Quaker, connected with the settlement of Pennsylvania?

24. Where was Acadia?

25. When did the first English women come to America?

26. What was the lost colony of America?

27. From what did the word "Yankee" come?

28. Who was the apostle to the Indians?

29. What noted explorer, with his son and six companions, was set adrift in Hudson Bay to perish?

30. What did Canonicus send to Governor Bradford to denote defiance, and how did the Governor answer it?

31. Can you give the anecdote of the resistance to Governor Fletcher at Hartford by the Connecticut people?

32. What child was born on board "The Mayflower"?

33. What price was paid for Manhattan Island?

34. Whence came the name "The Jerseys"?

35. Tell why Virginia is often called "The Old Dominion."

36. Who were the Moravians?

37. Tell what you can about the "Walking Purchase"?

38. Where was De Soto buried?

PERIOD OF COLONIAL GROWTH.

39. What was Bacon's rebellion?

40. What was the *pine-tree* money?

41. Why is Sir Edmond Andros noted in Colonial history?

42. Treat briefly these topics: King William's war—Queen Anne's war—King George's war.

43. Where did the Dutch Colony establish forts?

44. What was accomplished by Stuyvesant and his expedition of six hundred men against the Swedes?

45. Why did he make the expedition?

46. What was wampum, and for what used?

47. Who were the Five Nations? Who the Six Nations?

48. Who was Poor Richard?

49. Describe a block-house.

50. Who are meant by "William the Testy" and "Headstrong Peter"?

THE FRENCH AND INDIAN WAR.

51. What was the Ohio Company?

52. Locate Louisburg, Ticonderoga, and Fort Du Quesne.

53. Which of these were captured in 1758?

54. What were the principal events of 1760?

55. What was the conspiracy of Pontiac?

56. What can you write about the removal of the Acadians?

57. Who shot Braddock?

58. What territory did England acquire as the result of this war?

59. Relate briefly the story of Daniel Boone's life.

60. What became of Pontiac?

THE REVOLUTION.

61. What were the *Writs of Assistance?*

62. In what year was the Stamp Act passed? How soon was it repealed?

63. What color were the *stamps,* and to what kind of papers were they to be attached?

64. Can you tell what value of stamp had to be attached to the diploma of one graduating from college at that time?

65. Where was the Cradle of Liberty?

66. Can you quote the famous words of Patrick Henry's speech against the Stamp Act?

67. What is meant by the Boston Port Bill?

68. Can you name in order of size the three largest cities of the colonies at the outbreak of the Revolution?

69. Who were the Tories of the Revolution?

70. What general fell at Bunker Hill?

71. Draw a picture of the Union flag which Washington unfurled over camp, January 1, 1776. Tell what was represented by the different parts of the flag.

72. What was the "Continental money" issued at this time?

73. By whom was the Declaration of Independence written?

74. Who criticised it after it was written?*

75. How was it received by the people?

76. Of what advantage was the French and Indian War to the colonies, when we think of their struggle for liberty in the Revolution?

77. How was the Union flag changed during the year 1777?

78. Write a brief account of the marauding expedition of Governor Tryon.

79. What daring exploits were made by Col. Meigs and by Col. Barton?

80. Describe the Massacre of Wyoming.

81. Who was Mad Anthony, and why so called?

82. Can you name the captors of Major André, and tell how they were rewarded?†

83. What were the privateers?

84. Name five noted statesmen of the Revolutionary period.

85. What famous foreigners assisted the Americans in the Revolution?

86. What was the population of the colonies at the close of the Revolution?

87. Which campaign of the Revolution virtually decided the question of American independence?

88. What did England pay a head for the Hessians?

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* No student of American history should pass this period without reading thoroughly the Declaration of Independence.

† Compare the story of Nathan Hale's capture and execution with that of André's.

PERIOD OF NATIONAL GROWTH.

89. What was the indebtedness of the United States at the beginning of Washington's administration?

90. What States did not vote for Washington for President, and why?

91. What difference of views was there between the Federalists and the Democrats?

92. Where was the seat of government when Washington was inaugurated?

93. Describe the manners, dress, and customs of Washington's day.

94. What great statesman died during Washington's administration?

95. What was the Right of Search, and by whom was it claimed?

96. Describe the doings of the Algerine pirates.

97. In what battle and by what commander were the words "Don't give up the ship" used?

98. What general fought at Lundy's Lane that was afterwards a commander in the Mexican war and in the Civil War?

99. What battle was fought after the treaty of peace was signed?

100. Who was the hero of Lake Erie, and what were his famous words?

101. What is meant by the era of good feeling?

102. How were these States formed, and why so named: Indiana? Mississippi? Illinois? Alabama? Missouri? Maine?

103. To what does this statement allude: "Webster's reply to Hayne?"

104. What political party came into existence in opposition to Jackson's administration?

105. What was Jackson's principle of action with foreign governments?

106. Write a short account of Gen. Lopez and the Cuban filibusters?

107. Describe the formation of the government of the Confederate States of America.

THE CIVIL WAR.

108. Write a short sketch of Mr. Lincoln's life previous to his becoming President.

109. Who was Lincoln's Secretary of State?

110. How did Col. Elmer E. Ellsworth meet his death?

111. What became of the vessels Monitor and Merrimac?

112. Why was the new State of West Virginia erected in June of 1863?

113. Give an account of the riot in New York City.

114. Describe the capture of Jefferson Davis. What was done with him?

115. Give a short account of Maximilian, and the demand upon France made by the United States.

116. What was Black Friday?

117. Give an account of the Chicago fire.

GENERAL.

118. Name the Presidents in order and give the years in which the administration of each began and ended.

119. What Presidents died in office?

120. Name the Vice-Presidents that became Presidents.

121. Name a father and son who were Presidents?

122. Who was nominated for President three times and elected twice to office?

123. Who was President two terms and refused to be nominated for a third term?

124. Name the accessions of territory made by the United States, and state the price paid for each.

125. What was accomplished by the late Civil War?

126. What was the first method adopted by the United States for raising revenue?

127. What was the government of the American Colonies prior to 1775?

128. Name four great American statesmen, four authors, four orators, four of its most noted military commanders.

129. When did the United States first coin money?

130. What was the form of the government from 1776 to 1789, and why was a new Constitution devised?

131. In what arts has the progress of the United States been most rapid and reliable?

132. Name the Chief Justices of the United States.

133. Can you tell anything about these famous Indians: Osceola? Tecumseh? Black Hawk? Red Jacket? The Prophet? Powhatan?

134. What States were formed out of the Northwest Territory? Out of the Southwest Territory?

135. What was the first State admitted into the Union.

136. What money was used by the United States before it struck its own coins?

137. How great has the emigration to the United States during the present century been, and what are some of its effects?

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ANSWERS TO HISTORY, THIRD GRADE.

1. A race of men so called because of the mounds of earth they built.

2. ——— (Answers left blank are of such nature that the student should gain them without help.)

3. The construction of earthworks, the making of pottery, tools and other implements and ornaments.

4. Near Lake Superior. In the mine there is a mass of copper midway between the bottom and the top and supported on wooden logs. Their mining tools were found lying around as if the mine had just been left.

5. He was born in Genoa, about 1435. At ten years of age he studied navigation, and at fourteen went to sea. As he grew to manhood he became convinced of the rotundity of the earth and the necessity of a continent in the Atlantic, to balance the Eastern Hemisphere. He married the daughter of an eminent navigator, and became possessed of valuable nautical papers. He was very religious, and believed that there were people beyond the Atlantic to whom he should carry the Gospel. He first laid his plans before his own countrymen, who refused them; then he tried King John of Portugal. While awaiting a decision his wife died, and then he left Portugal and went to Isabella, Queen of Spain. He obtained a personal interview with the Queen, who promised to aid him.

6. With a fleet of three vessels Columbus left Palos on Aug. 3, 1492, and landing, October 12th, on the Island of San Salvador, set up a cross, and took possession of the country in the name of Ferdinand and Isabella. From there he sailed south and discovered Cuba. He returned to Spain in March, 1493.

7. Three.

8. The second time he discovered Jamaica and Porto Rico, and founded a colony in Hayti. The third time he sailed to South America and discovered the mouth of the Orinoco. On his fourth voyage he reached the coast of North America, but met with many hardships, and died soon after his return to Spain.

9. John and Sebastian Cabot, father and son, were natives of Bristol, England. Young Cabot discovered Labrador and Newfoundland, and later explored the coast to the Carolinas. Nineteen years after, in 1517, he sailed as far north as the Hudson Bay; still later he explored the coast of Brazil, discovering and naming the Rio de la Plata.

10. Amerigo Vespucci, a Florentine, discovered and explored the eastern coast of South America in 1499.

11. De Leon, a Spanish explorer, sailed with Columbus on his second voyage and was made governor of Porto Rico. He heard

that there was a fountain whose waters would restore youth, existing somewhere in the new country, and he set out to discover it. He landed near St. Augustine, in 1512, and named the country Florida.

12. Verrazani explored the coast from the Carolinas to Newfoundland, and named the entire region New France.

13. September 17, 1565, by Pedro Melendez.

14. It is a round building made of unhewn stone. There are two windows in it, and it rests upon eight columns. It is well preserved, except that it is roofless. It is supposed to have been constructed by the Norsemen who attempted to make settlements in that vicinity.

15. It is a rock near Dighton, Massachusetts, having upon it an inscription in an unknown language, supposed to have been made by the Indians.

16. In 1499 he made a voyage to the New World, and was the first to publish an account of it.

17. In 1534 Cartier was sent by the French king to make a settlement in New France. He explored the gulf around Newfoundland, and discovered the mouth of a great river. A year later he came again, passed up the St. Lawrence, which he named, and stopped at Quebec. The natives were friendly to the French, but when the latter sailed for France they decoyed on board the Huron king, and took him to France, where he died. For this reason when they returned four years later the Indians were hostile, and after much suffering the French were obliged to give up the idea of settlement.

18. De Soto, a follower of Pizarro, having been appointed governor of Cuba and Florida, set out to conquer the latter country, and search for gold. He landed at Florida, sent most of his vessels back to Cuba, and pushed towards the interior. They wandered round the country, vainly searching for treasure, and fighting the hostile Indians. In the spring of 1541 they discovered the Mississippi River. They continued their wanderings till the following spring, when they returned to the Mississippi, where De Soto died. His followers sunk his body in the river. After roaming over the prairies till more than half of them died, the remainder embarked in rude boats on the Mississippi. They sailed down the river and about the Gulf of Mexico, till at last they reached a small settlement and were sent to Cuba.

19. ———

20. The Huguenots were greatly persecuted in France, and Coligny determined to send them to a place of refuge beyond the Atlantic. In 1562 a company under John Ribault discovered Port Royal entrance, and chose that spot for their settlement, building a fort, which they named Carolina, after Charles IX. Ribault returned to France for supplies, but war was raging and Coligny was powerless. After waiting a long time the little garrison built a rude vessel and put to sea. They were picked up by an English ship

and taken to France. Later, in 1564, Coligny sent another company, who landed near St. Augustine. Many of these depredated on Spanish property in the West Indies, and in punishment they were all murdered by the Spaniards under Melendez.

21. Newfoundland.

22. He sent a number of expeditions. They explored the coast about Virginia, but all attempts at colonization failed.

23. In 1602 Gosnold tried to plant a settlement on Nantucket and Martha's Vineyard islands; in 1605 De Monts organized a permanent colony at Port Royal, Nova Scotia; in 1608 Champlain founded a settlement on the site of Quebec.

24. To trade with the Indians, and plant settlements between the 34th and 38th parallels. The Plymouth Company had the same rights between the 41st and 45th parallels.

25. The London Company sent some emigrants in 1607 to settle on Roanoke Island. A storm drove them into Chesapeake Bay, and they entered a river, naming it the James. They landed about fifty miles up the river, calling the place Jamestown. Most of these settlers were unfit for this enterprise. They did not prosper till John Smith was made president, when he, through his influence with the Indians, established a degree of prosperity. Smith was obliged to go to England for medical advice; and six months after, the colony, very much reduced, abandoned Jamestown. The next day ships arrived with new emigrants and fresh supplies, and all returned to Jamestown. In 1619 the first representative assembly of America met at Jamestown.

26. John Smith came over with the first settlers of Jamestown. He made great exploring expeditions, travelling three thousand miles within three months. Once he was made captive by the Indians, but through the intercession of Pocahontas his life was spared. He constructed a map of his explorations, which is still in existence in England.

27. Pocahontas was the favorite child of Powhatan, an Indian chief. She was stolen, and carried on board a vessel to Jamestown. Here she met John Rolf, whom she married. Afterward she accompanied him to England, dying there.

28. Hudson was eager to discover the north-west passage to India. He made two voyages, but was stopped by the ice. In 1609 he discovered the Hudson River. On his next voyage he sailed into Hudson Bay, where his crew mutinied, and left him and his son to perish.

29. In 1623, by the Dutch, on Manhattan Island.

30. After suffering severe persecution in England the Pilgrims fled to Holland. Hearing from the Dutch voyagers about the new world, they resolved to go there. Having obtained consent of the Plymouth Company to settle in Virginia, they proceeded thither; but anchoring within Cape Cod, they landed on the 22d of December, 1620, and named the place Plymouth.

31. Slavery was introduced in Virginia in 1619. A Dutch vessel sailed to Jamestown, and offered at auction 20 negroes, who were bought, and made slaves for life.

32. (*a*) Between 1628 and 1630 they founded the towns of Salem, Boston, Roxbury, Dorchester, Cambridge, Watertown, and Charlestown.

(*b*) The coast of Connecticut was first explored by Adrian Block in 1614. Later some Dutch traders built a fort on the Connecticut River. In 1633 a company of English settled at Windsor, and this company was increased by some Puritans, who built a small meeting-house on the site of Hartford. In 1636 about 100 left Boston, and settled at Hartford and Wethersfield, and a fort had also been built at Saybrook.

(*c*) Maryland was first settled by persecuted Roman Catholics from England. The first company reached the banks of the Potomac in December of 1633, and founded the town of St. Mary.

(*d*) Roger Williams was banished from Massachusetts. In 1636 he crossed Narragansett Bay, and named the place where he landed Providence. Two years later William Coddington and others settled in this vicinity, and in 1644 they united their settlements, and thus established the commonwealth of Rhode Island.

(*e*) Sir Ferdinand Gorges and John Mason obtained a grant of land extending from the Merrimac to the Kennebec, and inland to the St. Lawrence. In 1629 Gorges gave Mason a part of this grant, and he named the domain New Hampshire.

(*f*) Pennsylvania was founded by William Penn. The land was given him by King Charles II., on account of services rendered by Penn's father. Penn's object in founding Pennsylvania was to plant a colony where his brethren might live peaceably.

(*g*) In 1664 New Netherland passed into the hands of the English, and all the territory between the Hudson and Delaware rivers, north to the line of 41 degrees, was conveyed to Lord Berkeley and Sir George Carteret under the title of New Jersey. Soon after several families from Long Island settled at Elizabethtown.

33. The Pequods becoming jealous of the growing power of the white people continued to annoy them till the English declared war. Uniting all their forces, they marched to the Pequod country, took the chief fort, and killed more than 600 persons. After this the terrified Pequods made little resistance, and the English did not stop until the whole race of Pequod Indians was exterminated.

34. Delaware was settled by the Swedes in 1637; it was afterwards taken from them by the Dutch, and still later became a part of Pensylvania. A company of Barbadoes planters in 1665 made some permanent settlements in North Carolina. In 1670 two ships with emigrants came and planted a settlement on the Ashley River, a few miles above Charleston, and this was the first seeds of a South Carolina colony. A year later fifty families came and a large number of slaves. James Oglethorpe led the first settlers to Georgia. They were mostly laborers, who had been thrown into prison in

England because they were indebted to the rich. In 1773 the town of Savannah was erected.

35. A few came in the belief that they would find gold; but most of them came to avoid religious persecution and secure greater personal freedom.

36 It was the winter and spring of 1610, when the Indians, thinking to exterminate the English, refused to supply them with any provisions.

37. It was severe weather, many sickened and died, and those who survived endured much suffering.

38. The Spanish, the French, and the English.

39. Florida, New France, and Virginia.

40. The English claimed all the land between the 34th and 45th parallels. The French claims were north, and the Spanish south, of those parallels.

41. They were sent over from England, the planters paying their passage.

42. The Roman Catholic.

43. James Edward Oglethorpe.

44. A woman who was banished from Massachusetts in 1637 because of her religious views. She taught that as the Holy Spirit dwelt in every believer, its revelations were superior to man's teachings; that each individual had the right to judge of the soundness of the minister's teaching; and she firmly declared the doctrine of Election.

45. The Quakers were opposed to paying taxes, and would not fight in war. The Puritans wished them to leave New England, but they would not go; so they were imprisoned, publicly whipped, and several of them hung.

46. On account of the increasing number of settlements of the white people, King Philip determined to unite all the Indians in one effort to drive away the English. He struck the first blow in 1675, at Swanzey, as the people were returning from church, and many were slain. Then all the New England forces united in quelling the Indians. It was finally accomplished; but the war lasted two years, and as many as 600 lives were sacrificed, and 12 or 13 towns destroyed.

47. In 1686 Sir Edmund Andros was appointed governor of all the New England colonies. When he demanded a surrender of their charters, all complied except Connecticut, and Andros went to Hartford to enforce obedience. The assembly continued in session till candles were lighted, when the charter was laid on the table. As Andros stepped forward to take it the lights were blown out, and Captain Wadsworth, under cover of the darkness, seized the charter and concealed it in the hollow trunk of an old oak-tree near the Assembly chamber.

48. King William's, Queen Anne's, King George's.

49. This belief in witchcraft broke out at Salem in 1692 and lasted six months, during which twenty persons suffered death, fifty-five were tortured into a confession of witchcraft, and great numbers thrown into prison. Excitement on the subject was intense, and neither age, sex, nor rank afforded protection from suspicion.

50. The Dutch West India Company offered large tracts of land and certain privileges to those who should send or lead a certain number of emigrants to occupy and till the soil in New York. The proprietors of these estates were called Patroons.

51. Cornelius May, Peter Minuit, Wouter Van Twiller, Sir William Kieft, Peter Stuyvesant.

52. Charles II. gave the whole territory of New Netherland to his brother the Duke of York, who sent an English squadron to conquer the Dutch. It was an easy conquest, for the Dutch had weak means of defence, and having become dissatisfied with Governor Stuyvesant, were quite willing to try English rule.

53. Harvard College was founded in 1638 at Cambridge, Massachusetts. William and Mary College was founded in 1692 at Williamsburg, Va. Yale College was established at Saybrook, Conn., in 1701, and removed to New Haven in 1717. Princeton College was incorporated at Princeton, N. J., in 1738. In founding these colleges the people thought to strengthen the state by fostering education.

54. Father Hennepin traversed Illinois and explored the Mississippi as high as the Falls of St. Anthony. In 1673 Marquette sailed for a month down the Mississippi in a canoe, and returned by the site of Chicago into Lake Michigan and thence to Detroit. In 1681 La Salle sailed down the Illinois River to the Mississippi, down that river to the Gulf of Mexico, and made the return voyage successfully.

55. Dutch and English.

56. The oldest houses were made of earth or logs, and one story high covered with thatch; later ones, of wood and brick, two stories high in front and one in the back. These houses had immense fireplaces, in which they burned logs four feet long. The houses faced exactly south, so at noon the sun might shine square into them to tell it was dinner-time.—The dress of the people was simple, the law requiring each to dress according to his means.—In church, families did not sit together, but were distributed according to age, sex, or rank. Standing in different parts of the church were constables holding a wand, with which they touched persons who fell asleep. The services were often four hours long, and the sexton turned the hour-glass before the minister at the end of every hour. Their music was sung by the congregation from a metrical version of the Psalms. Everybody, unless sick, was compelled to go to church.

57. Disputes arose concerning territorial claims. The English claimed dominion westward to the Pacific south of the north shore of Lake Erie. The French claimed all the land watered by the

Mississippi and its tributaries, and they erected more than 60 forts between Montreal and New Orleans, and formed friendly relations with the Indians occupying that territory. The question was brought to an issue by a grant of land on the Ohio River to The Ohio Company. Surveyors were sent to make boundaries for settlements, and the French considering them intruders seized and imprisoned them.

58. On complaint of the Ohio Company Governor Dinwiddie sent a letter of remonstrance to St. Pierre, the French commander, by George Washington. In October, with only three attendants, Washington started on a journey of 400 miles. After many hardships he reached the French headquarters. He received a written answer, and after an absence of eleven weeks delivered it to Governor Dinwiddie.

59. ——

60. The Ohio Company sent out 30 men to construct a fort on the present site of Pittsburg. A party of French and Indians attacked and expelled them, and finished the fort, naming it Du Quesne. When Washington heard of this, he hastened forward and erected a stockade, calling it Fort Necessity. Being joined by 400 men, Washington was about to proceed to Fort Du Quesne when he learned of the approach of the enemy. After a conflict of ten hours, the French commander made honorable terms of capitulation, to which Washington agreed, and departed with his troops for Virginia.

61. One against Fort Du Quesne, another against Niagara and Frontenac, the third against Crown Point, and the fourth to drive the French from Nova Scotia.

62. In the first expedition the English were unsuccessful; the second was fruitless; in the third, the English fought a successful battle, but failed to take Crown Point; in the fourth, the English expelled the Acadians from their homes, and made themselves master of the whole of the country east of the St. Croix.

63. Braddock's army consisted of about 2000 British and provincials, the latter being commanded by Col. Washington. Washington tried to advise Braddock as to the Indian mode of fighting, but he would listen to no suggestions and fought according to European tactics. The Indians shot from thicket and ravine upon the exposed English army, and every officer except Washington was killed. When Braddock fell, Washington took command and began a retreat which was so well conducted that the enemy did not follow.

64. An expedition was planned against Crown Point, and an army assembled at Albany, but through the inefficiency of Loudoun, it was given up. The capture of the forts at Oswego by the French. In 1757 the expedition against Louisburg was abandoned. The same year the French captured Fort William Henry on Lake George.

65. Wolfe left Louisburg with 8000 troops, and landed a few miles below Quebec. The town was strongly garrisoned, and the main

army under Montcalm was stationed in a fortified camp on the north banks of the St. Lawrence. Eight weeks passed, and the English had made little gain, when Townshend suggested they scale the heights of Abraham, and attack the town on its weakest side. The affair was managed so secretly, that Montcalm had no suspicion of it till he saw the whole English army on the plains of Abraham. After a severe battle the French broke and fled, and five days later Quebec was surrendered.

66. It was signed at Paris, by which France ceded to Great Britain all her claimed possessions in America, east of the Mississippi and north of the latitude of the Iberville River.

67. Wolfe and Montcalm.

68. The natural disposition and character of the colonists were for the most part republican, and the growth of public opinion tended to independence. The colonists also refused to be taxed without representation. The passage by Parliament of acts destructive to colonial liberty, such as The Importation Act, Writs of Assistance, The Stamp Act, The Declaratory Act, The Mutiny Act, Duty upon Tea, The Boston Port Bill, were the causes that led to the Revolution.

69. They unanimously agreed to sustain Massachusetts in her opposition to the late acts of Parliament, and adopted resolutions to suspend all commercial intercourse with Great Britain till the wrongs of the colonists should be redressed. They sent an address to the English nation, one to the king, and one to the people of Canada, in which they stated their grievances and rights.

70. Gen. Gage hearing that the Americans were gathering military stores at Concord, sent 800 men to destroy them. Meeting 80 minute-men at Lexington, a skirmish ensued, and seven Americans were killed. After destroying the stores, the British hastened back, followed by the Americans, who killed 300 of the British in their retreat. This event thoroughly aroused the country.

71. May 10, 1775, Connecticut and Vermont militia under Ethan Allen and Benedict Arnold surprised and captured Ticonderoga, one of the most important forts of the English.

72. They voted to raise an army of 20,000 men, and elected George Washington commander-in-chief.

73. On June 16, 1000 men under Col. Prescott were sent to occupy and entrench Bunker Hill, which commanded an important part of Boston and the Harbor. Liking the position of Breed's Hill better, Prescott proceeded to fortify that. Gage and his officers were greatly astonished when at dawn they saw this work, and determined to drive the Americans from their position. Three thousand British landed at the foot of the hill and marched to the attack. When the British were within close shot the Americans fired, and the front ranks of the British were mown down. The Americans kept this up till their ammunition gave out, and were then obliged to retreat.

74. June 15, 1775.

75. The Americans under Montgomery captured St. John and Fort Chambly, and after a feeble resistance Montreal was also surrendered to them. The Americans pressed forward to take Quebec. In the battle Montgomery was shot, and the Americans had to retreat. Later they were driven entirely out of Canada.

76. The presence of British troops in Boston for the purpose of enforcing obnoxious laws increased public excitement, and on the 5th of March a serious difficulty occurred. An altercation had taken place between some citizens and soldiers, and a mob collecting near the troops assaulted a sentinel. The soldiers fired, killing three and wounding five. This is known as the Boston massacre.

77. The continuation of the tax on tea embittered the colonists more and more, and when it was known in Boston that several cargoes were on the way, they asked the governor to have it sent back. He refused; when it arrived a band of men disguised as Indians went on board the ships and emptied the tea into the water.

78. Massachusetts men who were enrolled in companies and prepared to take up arms at a moment's notice.

79. He wished to get control of the extensive sea coast of New England, and strengthen its defences.

80. Clinton foiled in an attempt upon New York, sailed south. Lee, after holding New York until Washington arrived with the main army, proceeded south to watch Clinton.

81. It is the day on which the Declaration of Independence was signed.

82. Soldiers hired from petty German rulers by the English king to assist in subjugating the colonists.

83. An army of 30,000 British were collected on Staten Island, and, August 22, 10,000 of them crossed over to Long Island. Detachments of Americans under Gen. Sullivan occupied a fortified camp in Brooklyn. Washington hearing of the invasion sent Gen. Putnam with large reinforcements to take chief command and meet the enemy. The American forces on the island numbered about 5000. The British advanced in three divisions, August 27, attacking the American outposts, killing 500 and taking 1100 prisoners. Then the enemy encamped near Putnam's lines, delaying further attack until the British fleet should co-operate. Under cover of a heavy fog on the night of the 29th, Washington crossed over from New York, withdrew his troops from camp, and unperceived by the British, returned, taking everything with them but the heavy cannons.

84. The sugar-houses of New York were made into prisons, and old hulks of boats were used as prison-ships. Into these the men were crowded by thousands, suffering much brutality at the hands of the officers.

85. First Washington retreated and fortified Harlem Heights; then

he withdrew to Westchester County, where occurred the battle of White Plains. The Americans were driven from their position, and Washington crossed the Hudson, joining Gen. Greene at Fort Lee. Now began the flight of the Americans across New Jersey. Newark, New Brunswick, Princeton, and Trenton fell into the hands of the British, and Washington crossed the Delaware with less than 3000 men. Gen. Howe ordered Cornwallis to wait for the river to freeze, and Washington profited by this delay. He was reinforced, and had 5000 effective men; so he determined to attack the Hessians whom Howe had stationed about Trenton. Christmas was at hand, and thinking the Germans would indulge in carousal, he made the attack then, killing about 45 and taking 1000 prisoners with arms, ammunition, and stores.

86. Four months before the Declaration of Independence Congress appointed Silas Deane to go to France as their agent and solicit co-operation. He obtained 5000 muskets and abundant promises of men. After the Declaration of Independence Congress appointed a regular embassy to France, and sent agents to Holland, Spain, and Prussia.

87. Cornwallis had left a small force at Princeton, and advanced to Trenton, where Washington was encamped. In the night Washington withdrew to fall upon the reserve at Princeton. He met a part of the troops marching to join Cornwallis, and a severe encounter ensued in which the Americans were victorious. Cornwallis hastened to aid his reserve, and the Americans, being in no condition to fight such a number, retreated to Morristown, where Washington established his winter quarters.

88. Howe was marching to Philadelphia, and Washington took a post near Wilmington, but was compelled to fall back to the Brandywine Creek. The Hessians attacked the Americans on the left, and Howe and Cornwallis fell upon them on the right. After a severe battle the patriots retreated.

89. Burgoyne took Ticonderoga and sent a force to destroy American stores at Bennington. This force was attacked by militia from Vermont and New Hampshire under Gen. Stark, and defeated. Another British force sent for the same purpose was also defeated. When Burgoyne formed a fortified camp on the plains of Saratoga, Gates advanced to meet him, and a severe but indecisive battle took place. Later Burgoyne was hemmed in by Gates's army until he was driven to surrender. Forty-two pieces of brass artillery, 5000 muskets, and great quantities of ammunition and stores fell into the hands of the Americans.

90. First they encamped at White Marsh, but on December 11 removed to Valley Forge, where they endured much suffering, being half fed, scantily clad, and living in rude huts.

91. At York, Pennsylvania.

92. With France.

93. It was proposed to repeal all the acts of Parliament since 1763,

and to treat the Continental Congress as a legal body, and commissioners were appointed to go to America and negotiate for peace.

94 Congress refused to negotiate with the commissioners until Great Britain should withdraw her fleets and armies, or acknowledge the independence of the colonies.

95 Clinton succeeded Howe in command of the British, and he withdrew from Philadelphia, across New Jersey, to New York. Washington pursued him, and an engagement took place at Monmouth, N. J., in which the British were compelled to retreat.

96. Mary Pitcher, while bringing water to her husband, saw him fall. She immediately took his place, and managed his gun so well that Washington afterwards appointed her a sergeant in the army.

97. Because the British had gained entire possession of Georgia, and were extending their power in the South.

98. On the 31st of May Stony Point fell into the hands of the British, and in July Gen. Wayne marched secretly to recapture it. This was so well carried out that the British did not suspect danger till the Americans fell upon them. At two o'clock in the morning Wayne, though wounded, wrote to Washington of his success.

99. The defeat of the tories upon the Carolina frontiers. The battle on Brier Creek, in which the British were victorious, and the siege of Savannah, in which the Americans withdrew.

100. He was the commander of an expedition of five vessels fitted out by the French and American governments to prey upon English shipping. While off the coast of Scotland with his flag-ship, the Bonhomme Richard, and two other vessels, he attacked a British fleet, and after a severe contest the English vessels surrendered.

101. To re-establish royal power in the South.

102. The surrender of Charleston to the British; the battle near Camden won by the British; the defeat of Sumter by the British; and the battle at King's Mountain, in which the British were totally defeated.

103. Marion, at the head of twenty men and boys, black and white, began to annoy the British. His company constantly increased, and the "Ragged Regiment" soon became a terror. During the entire summer and autumn he swept around Cornwallis, cutting his communications and making onsets as audacious as they were destructive.

104. In the beginning of the war Arnold fought nobly, and being disabled in the battle of Bemis' Heights was made a commandant at Philadelphia. Here he married, and, living far beyond his means, engaged in fraudulent acts to gain money. He was tried by a court martial, and by order of the court reprimanded by Washington. This disgrace made Arnold vengeful, and he began treasonable overtures with Clinton, bargaining to betray West Point into Clinton's hands. By patriotic professions Arnold got the command of West Point, and arranged with Major André, Clinton's

adjutant-general, a plan of operation. On his way back to Clinton, André was stopped and searched, and the plot revealed. André was hanged as a spy, and Arnold escaped to a British ship.

105. A powerful fleet bearing 6000 troops under Count de Rochambeau.

106. Among the Thickety Mountains, west of the Broad River, in South Carolina. The Americans were victorious.

107. The allied armies of the French and Americans arrived before Yorktown on the 28th of September, and began a regular siege. This continued till Cornwallis, despairing of aid from Clinton, surrendered on October 19.

108. Battle of Guilford, in which the Americans were repulsed; but the British loss was very great. The siege of Ninety-six, which the Americans finally abandoned. The battle of Eutaw Springs, in which the Americans were victorious.

109. The Continental money had become almost worthless, the pay of the officers and soldiers was greatly in arrear, and a large number started for Philadelphia to demand justice from Congress. They were met by a deputation, and the matter satisfactorily arranged. New York was evacuated on the 25th of November, 1783. The terms of the treaty of peace were these: A full recognition of the independence of the U. S.; Great Britain gave back Florida to Spain; all the remaining territory east of the Mississippi and south of the great lakes was surrendered to the U. S.; the concession of mutual rights in the Newfoundland fisheries; Great Britain retained Canada and Nova Scotia, with entire control of the St. Lawrence. On December 23, 1783, Washington, having bade farewell to his officers, delivered an able address to Congress, and surrendered his commission as commander-in-chief of the American army. He then retired to his home at Mount Vernon.

110. They were all impoverished by the war. There was a debt of 38,000,000 of dollars. Public affairs were in a condition of chaos.

111. There was no centralization of power, no system of commercial regulations, and no way to rid the country of debt.

112. 4th of March, 1789.

113. New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia.

114. Washington was inaugurated on the 30th of April, 1789, in New York City. The oath of office was administered by Chancellor Livingston. In the new government three executive departments —Treasury, War, and Foreign Affairs—were formed. A national judiciary was established, and also circuit and district courts.

115. Federalists and Republicans.

116. The law passed in 1791 imposing duties on domestic distilled liquors was resisted in western Pennsylvania by the people in

arms. The President quelled this by sending a body of militia to enforce obedience.

117. The French Government was displeased with the treaty made between the United States and England by John Jay. Soon after Adams's inauguration the American minister was ordered to leave France, and that government permitted depredations upon American commerce. Congress appointed three persons to go to France and settle the difficulty. They were refused an audience unless they would pledge the payment by the United States of a quarter of a million The United States immediately began preparations for war, and Washington was appointed commander-in-chief. At this the French Directory made overtures for a settlement, and Napoleon Bonaparte, into whose hands the government fell at this time, promptly received the United States embassadors.

118. The Alien Laws gave the President power to expel from the country any foreigner whom he thought dangerous to the public peace; the Sedition Laws, the power to imprison any one who might be conspiring against the government, and suppress all publications calculated to weaken the authority of the government.

119. Charles Cotesworth Pinckney. Because the French refused to treat with the American committee unless they should pay a tribute.

120. Before the trouble between the United States and France was settled Spain had made a secret treaty with France ceding the territory of Louisiana. When Jefferson learned of this he negotiated with Napoleon for the territory, and it was bought in the spring of 1803.

121. It extended from the British possessions on the north to the Gulf of Mexico on the south, was bounded on the east by the Mississippi, and the west by the Texan annexation, the Rocky Mountains, and the Pacific.

122. During Washington's administration Hamilton was Secretary of the Treasury. On account of a political quarrel he was challenged to fight a duel by Aaron Burr, the Vice-President. Hamilton reluctantly met him near Hoboken, N. J., where they fought with pistols. Hamilton discharged his into the air, but was shot and killed by Burr. After this Burr became very unpopular, and when his term of office ended he went into the West. Here he labored two years to perfect a treasonable scheme. His plans were to raise a sufficient military force, wrest the government of Mexico from the Spaniards, detach the Western and Southern States, and form a southwestern empire of which he should be dictator. He was suspected and tried, but was acquitted for want of sufficient proof.

123. A proclamation which detained all vessels in American ports, and ordered all American vessels abroad to return home. It failed to obtain from England and France any acknowledgment of American rights, and only crippled American commerce; it was soon repealed.

124. The Clermont was the first steamboat constructed on the present plan. It sailed up the Hudson against wind and tide at the rate of five miles an hour.

125. They explored the northwestern part of the territory of Louisiana. Having asscended the Missouri, they crossed the Rocky Mountains, and discovering the two rivers that now bear their names, followed them to the Columbia and thus reached the Pacific. Their journey lasted nearly three years.

126. Dispute about the right of searching American vessels and restrictions laid upon American commerce; incitement of the Indians in the West by British emissaries; and, finally, the British press boasted that the United States "could not be kicked into war." Then Congress laid another embargo act upon all vessels in American waters, and war was declared against Great Britain.

127. Battle of Queenstown Heights; battle on the river Raisin, siege of Fort Meigs and Fort Sandusky; battle on Lake Erie; battle on the Thames; battle at Chrysler's Field; battle of Chippewa; battle of Lundy's Lane; battle at Plattsburg.

128. In 1812, the capture of the British ship-of-war Guerriere by the Constitution, the British Frolic by the Wasp (but later both vessels were captured by a British ship), the Macedonian by the frigate United States, and the British Java by the Constitution. In 1813, the United States sloop-of war Hornet captured the Peacock, the English Shannon took the Chesapeake, and the American frigate Essex was also taken.

129. The battle at Bladensburg, a few miles from Washington. The English commander, Ross, pushed on to the city, burned the Capitol, President's house, and other public and private buildings.

130. The uprising of the powerful Creeks in the South instigated by Tecumtha. Andrew Jackson, accompanied by Gen. Cuffee with 2500 Tennessee militia.

131. Delegates from several New England legislatures met in a secret convention at Hartford to devise a measure for the speedy termination of the war.

132. On January 8, 1815, the British, having previously invaded Louisiana, advanced to make a general assault upon New Orleans. Jackson threw up a line of defence, and concealed 3000 marksmen behind his intrenchments. The enemy advanced till within range of the American rifles, when volley after volley poured upon them, and the entire army fled in dismay.

133. On the 24th of December, 1814. It merely signified that Great Britain and the United States, having been at war, agreed to be at peace.

134. The Buccaneers had two slave-trading establishments, one at the mouth of the St. Mary, Florida, and the other at Galveston. They carried on a secret trade in slaves, but were stopped by the United States troops.

135. The Seminole and Creek Indians, dissatisfied with the treaty of 1814, began depredations on the frontier of Georgia, but were suppressed, and removed from the ceded territory.

136. It was a compromise by which slavery was allowed in Missouri and all territory south of 36 degrees 30 minutes north latitude, and prohibited in all territory north of these limits.

137. The Federalists and the Republican or Democratic party.

138. When the countries of South America declared their independence, the United States gave this official recognition through Congress. The President followed in his annual message of the next year by declaring that in the future the American Continents were not to be considered as subjects for colonization by any European power.

139. In 1824 General Lafayette visited America. Everywhere the people received him with warmest enthusiasm, and an American frigate was sent by the government to convey him back to France.

140. It laid heavy protection duties upon cotton and woollen fabrics.

141. The Erie Canal in New York State.

142. In 1827 a road three miles in length was built at Quincy, Mass., leading from the granite quarries to the wharf.

143. John Adams and Thomas Jefferson.

144. That of giving the civil-service offices to the adherents of the party in power.

145. He vetoed the bill for renewing its charter, and on his own responsibility ordered the Secretary of the Treasury to withdraw the public fund and deposit it in certain State banks. The Secretary refusing to do this was dismissed from office, and his successor obeyed the President.

146. A war began in 1835 by the Seminoles, on account of an attempt to remove them to the wilderness beyond the Mississippi. It lasted four years.

147. The money that had accumulated in the vaults of the Bank of the United States, amounting to nearly $10,000,000.

148. The operation of the Specie Circular by which payments for public lands must be made in coin; the immense importation of foreign goods that had to be paid for in gold and silver; the order of Congress to withdraw the public fund from the banks and distribute it among the States according to their representation; a fire in New York City which consumed property to the amount of $18,000,000.

149. The bankers asked the President to rescind the Specie Circular. He refused, and all the banks in the country suspended specie payments. This so embarrassed the government that it was unable to obtain coin to discharge its own obligations, and was compelled to issue treasury notes.

150. The campaign of 1840, when Harrison ran against Van

Buren. Because Harrison had come from the West he was called "The Log-cabin Candidate," and all over the country log-cabins were built, where political meetings were held, at which cider was the only beverage drank.

151. The Whigs strongly favored the re-establishment of the Bank of the United States; the Democrats opposed it.

152. One month.

153. The bill for the rechartering of the Bank of the United States.

154. A movement to abandon the old charter and adopt a State constitution of government was made in Rhode Island in 1842, and a dispute arose concerning the proper method to be pursued. Two parties were formed, each electing a governor, and each took up arms. Order was restored by national troops, and Dorr, who had been elected in an irregular way, was imprisoned.

155. The definite boundary between the United States and Canada.

156. As soon as Texas had thrown off the Mexican yoke she asked to be admitted into the Union. At first this was refused, as it might cause war with Mexico, but in March of 1845 the bill was adopted.

157. To uphold the interests of slavery, extend its influence, and secure its permanent duration.

158. The first telegraph was invented by Samuel Morse. In 1843 he procured an appropriation of $30,000, and a telegraph line was constructed between Baltimore and Washington.

159. Depredations upon American vessels and property, the annexation of Texas, and the dispute about the boundary between Mexico and Texas.

160. A bill brought before Congress in 1846 by David Wilmot to prohibit slavery in all the territory which might be secured by treaty with Mexico.

161 By a treaty made at Washington in June, 1846, by which the northern boundary of the United States was fixed at 49 degrees north latitude.

162. The Mormons first settled in Jackson County, Missouri; but not liking their practices, the people determined to get rid of them. The militia was called out, and the Mormons crossed over into Illinois. Under the administration of Joseph Smith they practised laws contrary to the State, and Smith and his brothers were put in jail, where they were killed by a mob. In 1846 the Mormons marched west and founded Utah.

163. Battles of Palo Alto and Resaca de la Palma; battle of Buena Vista; siege of Vera Cruz; battle at Cerro Gordo; battles near the city of Mexico. In every engagement the Americans were victorious.

164. The whole of New Mexico and Upper California.

165. A laborer cutting a mill-race in California found pieces of gold in the sand. The news spread rapidly ; men became wild with excitement, and flocked there by thousands.

166. The American generals Scott and Taylor, and the Mexican general Santa Anna.

167. A bill introduced by Henry Clay in 1850. It provided, 1st, the admission of California as a free State ; 2d, the formation of not more than four States out of the Territory of Texas, said States to permit or exclude slavery, as the people should determine ; 3d, the organization of territorial government for New Mexico and Utah, without conditions on the question of slavery ; 4th, the establishment of the present boundary between Texas and New Mexico, and the payment to Texas for the territory surrendered the sum of 10,000,000 dollars from the national treasury ; 5th, the enactment of a more vigorous law for the recovery of fugitive slaves ; 6th, abolition of slavery in the District of Columbia.

168. A law providing for the arrest in the free States, and the return to their masters of all slaves who should escape.

169. "Uncle Tom's Cabin."

170. An expedition commanded by Commodore Perry went to Japan in 1852. Perry presented the emperor a letter from the President which solicited negotiations of a treaty of friendship and commerce between the two nations. The expedition was successful.

171. A bill brought before the Senate by Stephen A. Douglas to organize the Territories of Kansas and Nebraska, allowing the people to decide for themselves whether these States should be free or slave-holding. The bill was passed in 1854, and created much strife in Kansas, both factions rushing there in order to secure a majority.

172. Parties residing in Missouri, who could at any time cross the border, commit depredations, vote, and then retreat.

173. The maps on which the treaty with Mexico had been based were found to be incorrect, and the difficulty was settled by the purchase of the doubtful claim by the United States. This is known as the Gadsden Purchase.

174. That part of Arizona and New Mexico lying south of the Gila River and west of the Rio Grande.

175. A party that sprung up during Pierce's administration, their most important principle being opposition to foreign influence in public affairs.

176. It was a decision of the Chief Justice that a freed negro slave or a descendant of a slave could not become a citizen of the Republic.

177. On October 16, 1859, John Brown, who had conceived the idea of liberating the slaves of Virginia, went secretly to that State with a few followers, and seized the United States arsenal at Harper's Ferry. A military force was sent to quell them, and Brown with several others was captured and hanged.

178. Washington Irving.

179. Dr. Kane was an arctic explorer. He made two expeditions, the last one in 1853.

180. Stephen A. Douglas, John C. Breckinridge, John Bell, Abraham Lincoln.

181. The Missouri agitation of 1820–21; the annexation of Texas, thereby increasing the domain of slavery; the Kansas-Nebraska Bill by which the Missouri Compromise was repealed, had aggravated the discord between the North and the South; and when in 1860 the South failed to elect their candidate, and saw that the increase of population in the North threatened to put them in the minority, they thought the time for action had come. They contended that the highest allegiance of the citizen was to the State rather than to the general government, and that a State had the right to secede.

182. South Carolina.

183. Mississippi, Florida, Alabama, Georgia, Louisiana, and Texas.

184. Restrained by fear or excessive caution, the President made no serious effort to suppress these seizures.

185. Major Anderson commanded Fort Sumter, and when a government vessel attempted to carry him supplies and reinforcements the conspirators fired upon her, driving her out of the harbor. The fort was attacked on April 12, and two days later Anderson, whose provisions were exhausted, evacuated the fort.

186. Virginia, Arkansas, North Carolina, and Tennessee.

187. On April 19 the Sixth Mass. Regiment in passing through Baltimore was assailed by a mob; two soldiers were killed and several wounded. The battle of Bull's Run occurred on July 21. At a moment when the Confederates were about to give way they were reinforced, and the National troops defeated with a loss of about 3000. Another battle disastrous to the National troops occurred at Ball's Bluff on the 21st of October. The legislature of Missouri had refused to pass a secession ordinance, and that State became a battle-field for the contending parties.

188. The Confederate Congress had appointed Mason and Slidell to go to England and France as ambassadors. They escaped to Havana, and there took passage in the British steamer Trent. The vessel was overtaken by a United States frigate, the two men seized, taken to Boston and imprisoned. England demanded reparation for this insult; the two men were sent there, and suitable apology made.

189. The queen issued a proclamation of neutrality, but suffered privateers and blockade-runners to be fitted out in English ports.

190. Missouri, though slave holding, retained her place in the Union, and both parties struggled to gain control there. The Confederates under Gen. Polk gathered at Belmont, and Gen. Grant was sent to dislodge them. He made a vigorous and successful attack, but the Confederates being reinforced, Grant was obliged to retreat. Early in 1862 a flotilla of gun-boats, assisted by Grant's

land forces, captured Fort Henry, and pressed on to take Fort Donelson. After a severe contest, Gen. Buckner's army of 10,000 men, and all the magazines, stores, and guns of the fort, were surrendered to the Federals. After this victory Grant ascended the Tennessee and established a camp near Shiloh Church, where he was attacked by the Confederates. A severe battle occurred, with great slaughter on both sides, but the Confederates were at length forced to retreat. About this time New Madrid and an important fort on Island Number Ten was surrendered by the Confederates to Gen. Pope. This opened up the Mississippi as far down as Memphis, and shortly after that city was also taken. Grant's purpose was now to complete the opening of the river throughout its entire length. His first point of attack was Vicksburg, which was regarded impregnable. By a series of skillful movements Grant gained a suitable position for operations. A number of battles took place favorable to Grant, and Pemberton was at last forced to surrender Vicksburg.

191. On March 8 the Merrimac, a new kind of naval vessel, produced great havoc in Hampton Roads by destroying several frigates. The next morning a newly invented floating battery named the Monitor steamed out to meet the Merrimac and opened fire. For two hours both vessels kept this up without any effect, till the Monitor put a shell through a port-hole of the Merrimac, killing many of the crew. The Merrimac was disabled and then withdrew.

192. Under Gen. McClellan they marched by the way of the Peninsula between the James and York rivers, and remained at Fortress Monroe till April 3, when they proceeded toward the capital. Yorktown was taken, the Confederates fleeing to Richmond. The Union troops pursued them, and a severe engagement took place at Williamsburg, in which the Nationals were victorious. When they were within seven miles of the city, on the 31st day of May, the Confederates attacked them at Fair Oaks, and for two days a battled raged with great fury. McClellan's victory was by no means decisive. The Confederate commander, Gen. Johnson, was wounded, and his place filled by Robert E. Lee. On June 25 Lee swept down upon the right wing of the Union army, and an indecisive battle was fought. For seven days the struggle between the two armies was kept up. McClellan, instead of pushing on to Richmond, retired a few miles down the river, and Lee formed the plan of capturing Washington. Then McClellan was ordered to hasten to the aid of the troops about Washington. There were battles at Cedar Mountain and Bull's Run. The contest was severe, and the Nationals were driven to the fortifications about Washington.

193. Gen. Lee led his army across the Potomac, capturing Harper's Ferry with 11,000 men and all its munitions of war. On September 17 a great battle was fought near Antietam Creek. The Confederates, being beaten with a loss of 20,000 men, crossed the Potomac and retired toward Richmond.

194. In the summer of 1862 guerrilla warfare was extensively

carried on in Kentucky by detached bands of men, the most noted of which was John Morgan's, who committed extensive plunder and destruction.

195. The Confederates were strongly intrenched on the heights of Fredericksburg. On December 13 the Union troops began an attack. Numbers of them were killed, while those on the heights lost hardly a man. The assault was renewed again and again till Burnside was persuaded to retreat across the river. This battle was most disheartening to the Nationals.

196. ——.

197. General Grant spent three months among the swamps and hills around Vicksburg, trying to get a position in the rear of the town. Finally he determined to run the fleet past the batteries. He did this, and then marched his land forces to form a junction with his fleet. Then followed the battles at Port Gibbon, at Raymond, at Jackson, at Champion Hills, and at Black River Bridge, in all of which the Confederates were beaten. Disheartened, they retired within the defences of Vicksburg. At first Grant tried to take the city by storm, but was repulsed, and therefore began a regular siege. The Confederates held out for a month and then surrendered. By this act an army of 30,000 became prisoners of war, and thousands of small arms, hundreds of cannons, large quantities of ammunition and stores fell into the hands of the Union.

198. On the 1st of January, 1863. It proclaimed the freedom of all slaves in territories wherein rebellion existed.

199. In the first week of May the Army of the Potomac under Gen. Hooker had a severe encounter with Lee at Chancellorsville. Hooker withdrew his forces, losing 17,000. The Confederate loss was less than 5000. Elated by his success, Lee invaded Maryland in the middle of June, and pushed on to Gettysburg, Penn. There he met the Union troops under Gen. Meade, and a severe battle ensued, in which the Confederates were routed.

200. By attacking Fort Sumter with an iron-clad fleet.

201. ——.

202. Gen. Rosecrans had compelled the Confederates to fall back to Chattanooga. From there they were driven to Chickamauga, where they turned and attacked the Union troops, and the Nationals retreated.

203. After the battle of Chickamauga Gen. Grant was promoted to chief command of the army in the West. The Confederates were stationed in two divisions on Lookout Mountain and Missionary Ridge. On November 24, under cover of a heavy fog, the Nationals scaled Lookout Mountain and routed the Confederates. The next day Missionary Ridge was taken in the same way, the Confederates fleeing into Georgia. Their loss in killed, wounded, and prisoners was over 10,000.

204. General Morgan, in June, went into Indiana with about 3000

cavalry, and moved eastward, plundering as they went. They were utterly disbanded by home troops.

205. On February 3, Sherman left Vicksburg, made a destructive invasion of the country eastward, and then returned. He was next sent to command the army at Chattanooga. In May Sherman advanced from this point, driving the Confederates before him till they reached Atlanta, and after a heavy siege the Nationals entered the city. On November 14, Sherman burned the city and began his march to the sea, and in December he took up his headquarters in the city of Savannah, having carried everything on his way.

206. Sherman garrisoned Savannah, and began his march against Columbia, which was surrendered on the 17th of February. He destroyed the arsenals, machine shops, and foundries of the city, and proceeded into North Carolina. On March 17 he was attacked by Johnson near Bentonsville, but after tremendous fighting Sherman marched on and entered Raleigh, where he received the surrender of Johnson's army.

207. This expedition was conducted in the spring of 1864 by Gen. Banks. Its object was the capture of Shreveport, the seat of Confederate government in Louisiana. The expedition was a failure.

208. The defences of Mobile were captured by the Western Gulf Squadron under Farragut, assisted by a land force under Gen. Granger. The vessels sailed into Mobile Bay in pairs lashed together, and the last defence was surrendered on August 23. Thus the port of Mobile was effectually closed. On April 12, 1865, Generals Canby and Wilson with 25,000 troops marched to take the city of Mobile, and after a severe engagement entered the city.

209. For nine months Grant and Lee had confronted each other on the James and Appomattox rivers. There had been several hostile movements, but none of them decisive. On April 1, Grant sent Sheridan to get in the rear of Lee, and at Five Oaks a severe battle was fought which was very disastrous to the Confederates. The fighting continued, each battle thinning the Confederate forces, till on the 9th of April Lee surrendered.

210. The Confederates under Early had invaded Pennsylvania, and returned to the Shenandoah Valley. Grant appointed Sheridan over an army of 40,000 to put an end to their raids. He attacked and routed Early at Winchester on September 19, and a few days later assaulted him again, gaining another victory. Then Sheridan with torch and axe ravaged the valley. On October 19, Early routed the Union troops, but Sheridan meeting and recalling them, they turned upon the Confederates and gained a complete victory.

211. The Alabama was a British war-ship with a Confederate commander. In her whole career she destroyed 66 vessels with a loss of 10,000,000 dollars to the merchant service of the United States. She was destroyed off the coast of France in June, 1864.

Other privateers were the Sumter and Florida, both constructed in England.

212. Lincoln and McClellan. Lincoln was elected.

213. On April 14 President Lincoln attended the theatre with his wife and some friends. As the play drew to a close, John Wilkes Booth went into the President's box and shot him through the head. Mr. Lincoln died the following morning.

214. Nearly three thousand millions of dollars.

215. By the Thirteenth Amendment to the Constitution.

216. A proclamation issued on May 29, 1865, by President Johnson, whereby, upon taking the oath of allegiance to the United States, general pardon was extended to all persons, except those specified in certain classes, who were engaged in the Rebellion.

217. Alaska. 7,200,000 dollars.

218. The attitude of the executive and legislative departments became more and more unfriendly. The President began the work of reorganizing the governments of the seceded States, independent of Congress, and Congress appointed a Reconstruction Committee to devise plans. Congress passed bills for securing the rights of citizens to the freedmen, which the President vetoed. He also denounced the position of Congress as a new rebellion against the government of the United States.

219. Because of his removal for second time of the Secretary of War after the Senate had reinstated him.

220. Citizenship to the negro.

221. The cable laid in 1858 soon ceased to work. Cyrus Field made fifty voyages across the Atlantic, and secured capital for a second cable. This broke. In 1866 the Great Eastern started with a third cable, and this time the work was successful. The Union Pacific Railroad was projected in 1853. Ten years after, its construction was begun. It was finished in 1869.

222. The right of suffrage to the negro.

223. Claims of the United States for damages caused by the Confederate cruisers that had been built and equipped in England, the most destructive of which was the Alabama. The difficulty was settled by a court which met at Geneva, Switzerland. Great Britain was obliged to pay the United States fifteen and a half millions of dollars.

224. Horace Greeley.

225. Colorado.

226. It was a world's fair held at Philadelphia, in celebration of the hundredth year of the nation's history. Vast buildings were erected; products were sent from all nations of the world. Thousands of foreigners and millions of Americans visited the exhibition. It knit a web of acquaintance all over the country. It showed the advancement made by America in the arts, industries, and inventions, and opened up new avenues of trade for the country.

227. The Sioux Indians retired to their reservation January 1, 1876. Gold was discovered in the vicinity, and adventurers flocked there. This gave the Indians an excuse for plundering; breaking over the limits, the Government sent troops to drive them back. The trouble was finally quelled, but General Custer and nearly 300 of the Seventh Cavalry were killed.

228. Rutherford B. Hayes and Samuel J. Tilden.

229. A dispute arose as to which candidate was entitled to the electoral votes of Louisiana, South Carolina, and Florida. There was great excitement, some fearing that civil war would ensue.

230. It did not.

231. All disputed election returns were referred to a Joint High Commission, consisting of five members chosen from the Senate, five from the House of Representatives, and five from the Supreme Court, and their judgment should be final. The Commission decided that the votes of the disputed States should be counted for Hayes.

232. William M. Evarts.

233. He withdrew all U. S. troops from the state-houses of States formerly in rebellion, and prohibited the interference of U. S. troops in the elections in those States.

234. The President reasoned that these States had been readmitted as States; that they were no longer subject to the laws of war, and could not be regarded as conquered territory.

235. James A. Garfield and Winfield S. Hancock.

236. James A. Garfield was born in Ohio in 1831. He was graduated from Williams College, and afterwards was president of Hiram College, Ohio. He was a soldier in the Civil War, and was made chief of staff to General Rosecrans. In 1862 he was elected to the lower house of Congress, in 1879 to the United States Senate, and from there to the Presidency.

237. James G. Blaine.

238. On the 2d of July, 1881, President Garfield was shot in the Baltimore depot at Washington by Charles J. Guiteau. People from all over the world expressed their sympathy for the wounded President, his family, and the American people. The President died on the 19th of the following September.

239. 50,152,866.

240. James G. Blaine and Grover Cleveland.

241. Great enthusiasm prevailed, monster processions paraded in the large cities, and efforts were made by each party to vilify the opposing candidate.

242. The regulation of civil appointments to positions in the service of the Government.

243. Grover Cleveland and Thomas A. Hendricks.

244. Thomas F. Bayard of Delaware.

245. General Grant. Ulysses S. Grant was a native of Ohio. He was graduated from West Point Military Academy in 1843. He served with distinction in the Mexican War. During the Civil War, in 1864, he was made commander-in-chief of the Union Army. In 1868 he was nominated for President in the Republican Convention, and had no competitor. He was President of the United States two terms. Soon after retiring from the Presidency he made a tour of the world, and was everywhere received with honor. In the winter of 1885 it became known to the people that General Grant was suffering with throat disease. His condition grew worse, and in the following July he died.

246. The fact that Generals Buckner and Joseph E. Johnston, noted Confederate generals, acted with Generals Sherman and Sheridan as pall-bearers.

247. General McClellan.

248. (1) Extended labor strikes during which much property was destroyed and business greatly disturbed. (2) The Anarchist riot in Chicago in which seven persons were killed and many others injured. (3) The earthquake shocks at Charleston, S. C., which continued at intervals for several weeks. (4) The passage of a new bill for succession to the Presidency in case of the death of the President and Vice-president. (5) The passage of the Interstate Commerce Act.

249. The chief issue was the question whether this country should reduce largely the duties on imports advocated by the Democratic party or adopt the policy of protection favored by the Republican party.—Benjamin Harrison and Levi P. Morton, the Republican candidates, were elected.

250. James G. Blaine.

251. Delegates sent as representatives of the leading governments of Central and South America by invitation of the United States, who met in Washington, Oct. 1889. They spent several months in visiting the principal cities of the United States. The object of the congress was to effect for commercial purposes a closer union of the Americas.

252. The western half of Indian Territory. Opened at noon on April 22, 1889, when about 50,000 people entered the territory for settlement.

253. A reservoir dam broke during a freshet at Johnstown, Pa., and a body of water 40 ft. high and half a mile in width swept through the valley at the rate of 2½ miles a minute. The loss of life is estimated from two to five thousand; the destruction of property at $10,000,000.

254. North Dakota, South Dakota, Montana, Washington, Idaho, and Wyoming. In the latter women are allowed to vote and hold office.

255. James G. Blaine.

256. The principal issue was the tariff. The Republicans favored the schedule of duties according to the "McKinley Bill," which had recently been passed by the Republican majority, and the Democrats advocated a tariff for revenue only.—Benjamin Harrison and Whitelaw Reid were the Republican nominees; Grover Cleveland and Adlai E. Stevenson, the Democratic. The latter were elected by a large majority.

257. The Populist party.—Nationalization and government ownership of railroads, telegraphs, etc.

258. During the spring and early summer of 1893 business became greatly depressed and money to carry on trade was difficult to obtain. Many failures resulted. This condition was attributed to the continued large purchases of silver by the Government, and an extra session of Congress was called to repeal the Silver Bill. A repeal bill passed the House in three weeks. The vote upon it was delayed nine weeks longer in the Senate, but passed Oct. 30. The repeal restored confidence, but business depression continued.

259. An international exhibition of arts and industries held at Chicago from May to November, 1893, to commemorate the discovery of America by Columbus. In size, in beauty and magnificence of its buildings and grounds, in variety and extensiveness of its exhibits, it surpassed all other World's Fairs.

260. The Sherman Silver Purchase Act, of 1890, was repealed November 1, 1893. It was thought that a revival of business would follow its repeal; failures, however, continued, business depression was widespread, gold went out of the country, and imports fell off to such an extent that at the end of the year the Government receipts were $34,000,000 behind its expenditures. The cause of the depression was attributed to the intention of the Democratic Party to repeal the McKinley tariff. William L. Wilson, of West Virginia, introduced a new tariff bill at the regular session of Congress, in December, 1893. This bill became a law on August 27th of the next year without the President's signature. One section of this bill provided for a tax of 2 per cent on all in-

comes of more than $4000. The constitutionality of the income tax was contested and the Supreme Court declared the law unconstitutional. Business depression continued, gold was withdrawn from circulation, and the reserve of gold in the Treasury fell so low that bonds were issued from time to time in order to maintain the gold reserve, so that during 1894–5 $262,000,000 were added to the bonded debt of the Government.

261. When Mr. Cleveland came into office there was pending in the Senate a treaty providing for the annexation of the Hawaiian Islands. In January, before Mr. Cleveland's inauguration, a revolution took place in those islands, in which the Queen, Liliukolani, was deposed and a provisional government set up. Commissioners had been sent from the provisional government to Washington to negotiate a Treaty of Annexation. This treaty was sent to the Senate for approval on February 15th. During the revolution a force of marines had been landed from a United States vessel at the request of the leaders of the revolution, and the American flag had been raised over some of the buildings. President Cleveland, fearing that the presence of these marines might have contributed to the success of the revolution, determined to recall the treaty from the Senate and send a paramount commissioner to the islands to investigate. The commissioner reported that the revolution would not have occurred had it not been for the presence and aid of the marines from the United States vessel "Boston," and that the deposition of the Queen was due to the United States officials. President Cleveland, therefore, sent a new minister instructed to announce that the annexation would not be confirmed, and to use all efforts to reinstate the Queen. In this he failed because President Dole, of the Hawaiian Republic, denied the right of the President of the United States to interfere in the internal affairs of Hawaii, and refused to recognize the Queen.

262. A dispute in the boundary line between Great Britain and Venezuela had gone on for nearly half a century. In 1895 President Cleveland, feeling that the United States should take cognizance of the encroachments which Great Britain was making upon the territory of Venezuela, reasserted the Monroe Doctrine, informing Great Britain that the established policy of the United States was against the forcible increase of territory by any European power in the New World, and inviting Great Britain to submit her claims to arbitration. Great Britain replied that the Monroe Doctrine was not applicable to the state of things at the present day. The President then asked Congress for authority to appoint a commission to examine into the question and to report. After their report, President Cleveland declared that in his opin-

ion it was the duty of the United States to resist by every means in its power the wilful aggression of Great Britain upon the rights of Venezuela. Great excitement was thereby aroused in Great Britain and in our own country, but at length a Treaty of Arbitration was signed at Washington between Great Britain and Venezuela.

263. The Republican Convention, which met in June, nominated William McKinley, of Ohio, and Garret A. Hobart, of New Jersey, and declared the opposition of the Republican Party to free coinage of silver except by international agreement. The Democratic Convention met in July and nominated William J. Bryan, of Nebraska, and Arthur Sewall, of Maine, and declared for the free and unlimited coinage of both silver and gold at the ratio of 16 to 1, without waiting for the expression or consent of any other nation. A very exciting campaign ensued. There was a split in the Democratic Party, and a convention of the gold Democrats was held in September which took the name of the National Democratic Party, and nominated John M. Palmer and Simon P. Buckner on a platform which declared for gold standard. There were other nominations for the presidency by the Prohibitionists, by the National Party, by the Socialist Labor Party, by the Silver Party, and by the Populists. The Silver Party indorsed the nomination of Bryan and Sewall. The Populists nominated Bryan and Thomas E. Watson. The campaign was carried on to educate people on the effect upon finances and the credit of the country of a gold standard and as to a silver standard. The election resulted in the choice of McKinley and Hobart.

M'KINLEY'S ADMINISTRATION.

264. After his inauguration President McKinley called a special session of Congress to revise the tariff. On the 24th of July, 1897, the work of Congress ended in the enactment of the Dingley Tariff.

265. Large importations of merchandise were made to take advantage of the low tariff of the Wilson Bill before the Dingley Tariff went into effect.

The Dingley Tariff failed to increase the revenues sufficiently to meet the expenditures of the Government and was therefore a disappointment to its promoters.

SPANISH-AMERICAN WAR.

266. Cuba was laid waste, owing to the Spaniards' plan of destroying everything that might afford food or shelter to the insurrectionists; the *reconcentrados* were crowded in the cities,

whither they had been driven by the Spaniards, and were dying there of starvation, exposure, and disease by thousands; the Spaniards, having brought about all this, were masters of only little more than the towns and were themselves rapidly dying with disease; the Cubans suffering in the hills and woods were gaining on their foes, though not yet able quickly to end the horrors of war. The Spaniards were practising all sorts of mediæval cruelties alike on *reconcentrados* and captured Cubans and Americans.

These conditions caused the Americans to suffer great damages through the ruination of their trade, and put their government to great trouble and expense to prevent filibustering expeditions from leaving its shores, to investigate injuries to Americans, to prevent the spread of disease, and to relieve the *reconcentrados*.

267. On January 24, 1898, in accordance with the decision of the United States government "to renew its friendly calls at the Cuban ports," the warship *Maine* was ordered to the harbor of Havana. In return the Spanish battleship *Vizcaya* was immediately ordered to call at American ports. On the night of February 15, in the harbor of Havana, the *Maine* was destroyed by an explosion, in which 266 of her men were killed. A naval court of inquiry appointed by President McKinley reported that the ship could have been so demolished "only by the explosion of a mine situated under the bottom of the ship." Though the court was unable to fix "the responsibility for the disaster on any one," the general opinion in America and in Europe was that Spain was responsible for it, either directly or indirectly. Consequently the destruction of the *Maine* increased the strained relations existing between the two governments.

268. On April 25, 1898. On the grounds of humanity, of civilization, and of endangered American interests.

269. The first engagement of the war was the bombardment of Matanzas, Cuba, on April 27, by the *New York*, *Puritan*, and *Cincinnati*, of Admiral Sampson's squadron. The defending guns of the place were silenced.

270. Late in May, 1898, Commodor Schley, of the American flying squadron, traced the Spanish fleet, in command of Admiral Cervera, to the harbor of Santiago de Cuba, and in co-operation with Admiral Sampson, of the American heavy squadron, at once set guard over the harbor. Preparations were begun for a general siege of Santiago. On June 10 a point of vantage was seized at Guantanamo, which was the first invasion of the island made by the Americans, and on June 20, 1600 Americans in command of General Shafter arrived at the east coast of Santiago Bay,

where, with the help of the fleet and the Cubans, they effected a landing. After several skirmishes and the battle of Siboney, the Americans succeeded in surrounding Santiago, and on July 1 began an attack. The Spanish were assisted by their fleet, which shelled the positions of the American forces until July 3. Then Admiral Cervera made a bold dash for the open sea in order to escape, and all of his ships were sunk and he and the other survivors captured by the American fleet. The Spanish still refusing to capitulate, the Americans bombarded the town from their ships, on July 11. On this day the Americans were reinforced by 6000 men. On July 17 Santiago and eastern Cuba, including 2500 Spaniards, were formally surrendered to General Shafter. The siege cost the Americans 1593 men killed, wounded, and missing.

271. Admiral Cervera having anchored his fleet within the narrow-mouthed harbor of Santiago de Cuba, the United States at once undertook to entrap the fleet by shutting off its return to sea. A plan proposed by Lieutenant Richmond Pearson Hobson, of Admiral Sampson's fleet, to accomplish this at the expense of the fewest possible lives and ships, was accepted. Accordingly, on June 3, Hobson and seven other men ran the coal-carrying steamer *Merrimac* through a terrific fire from the Spanish forts on shore, into the narrowest part of the harbor entrance, and sank her there in such a position as to prevent the passage in or out of any large vessel. The eight men escaped with their lives and surrendered to the Spanish, but their exploit marked the turning-point of the war in favor of the United States.

272. On July 3, the Spanish fleet of six battleships passed the *Merrimac* obstruction one by one and attempted to dash past the United States fleet, also of six ships, guarding the mouth of the bay of Santiago de Cuba. A battle ensued in which the Americans, though two of their battleships were too far away to engage in active fight, sank every Spanish ship.

273. On July 7. At the opening of the Spanish-American War, the Hawaiian Islands deferred proclaiming neutrality, and in April President Dole offered the Islands to the United States as a basis and source of supplies during the war. Measures to protect the Islands from punishment for this act culminated in their annexation.

274. Though Commodore Dewey's brilliant annihilation of the Asiatic fleet of Spain on May 1, 1898, opened to him the door of the Philippine Islands, in order to take possession of them he needed reinforcements. For this purpose General Merritt was sent to him with about 20,000 men. By July 25 General Merritt and his troops had reached their destination, and a combined

attack by land and sea was begun on Manila. On August 13 the Spaniards were driven to the city walls and the city was surrendered to the Americans, their seizure of the city thus occurring before the news of the protocol reached the Islands.

275. The campaign in Porto Rico was undertaken on the same plan as that of Cuba. The Spaniards were 6000 or 8000 strong and were intrenched mostly in the north, in and about San Juan, while in the south they held Ponce, next in size to San Juan. The Americans guarded the north coast with their navy, and sent the army of 3415 men under General Miles, to begin its work in the south, near Ponce. A landing was made in the harbor of Guanica on July 25, and on July 27, with the aid of menaces of bombardment from the fleet, Ponce was captured peaceably. The victors were welcomed as deliverers by the Porto Ricans. Warranted by their attitude, General Miles ordered detachments of his small army to advance in all directions. At the end of nineteen days the peace protocol brought hostilities to an end; all the manœuvres were left incomplete, it is true, but during the entire campaign the Americans had advanced steadily with no opposition more serious than four or five skirmishes. They were within a short distance of San Juan, when the protocol ended the war.

276. On August 12 the protocol was signed at Washington, D. C. Its chief points were summed up in the official announcement as follows:

1. That Spain will relinquish all claim of sovereignty over and title to Cuba;

2. That Porto Rico and other Spanish islands in the West Indies, and an island in the Ladrones, to be selected by the United States, shall be ceded to the latter;

3. That the United States will occupy and hold the city, bay, and harbor of Manila pending the conclusion of a treaty of peace which shall determine the control, disposition, and government of the Philippines;

4. That Cuba, Porto Rico, and other Spanish islands in the West Indies shall be immediately evacuated, and that commissioners, to be appointed within ten days, shall, within thirty days of the signing of the protocol, meet at Havana and San Juan, respectively, to arrange and execute the details of the evacuation;

5. That the United States and Spain will each appoint not more than five commissioners to negotiate and conclude a treaty of peace. The commissioners are to meet at Paris not later than October 1;

6. On the signing of the protocol hostilities will be suspended, and notice to that effect will be given as soon as possible by each government to the commanders of its military and naval forces.

ANSWERS TO HISTORY. SECOND GRADE.

1. East of the Mississippi were the Algonquins, Huron-Iroquois, Mobilians, Cherokees, Tuscaroras, Catawbas, Uchees, and Natches; between the Mississippi and the Rocky Mountains were the Dakotas; the Shoshones occupied territory on both sides of the Rocky Mountains; and between these mountains and the Pacific were the Athabascans, Californians, Klamaths, and Selish.

2. The Mohegans to the Algonquins, Creeks and Seminoles to the Mobilians. The Powhatan Confederacy, and the Sacs and Foxes to the Algonquins. The Sioux to the Dakotas. The Mohawks to the Huron-Iroquois.

3. They believed in the existence of two spirits, one good and the other evil; they also adored an invisible great master of life which they called Manitou. They thought every animal had a great original; the first buffalo, the first eagle, etc., was the Manitou of the whole race. Their government was vested in a sachem or chief, who generally owed his elevation to his own merits as a warrior or orator. Their habits were very unsettled; they lived in wigwams, which they moved from place to place. The men were employed in war, hunting, and fishing, while the women performed all menial services.

4. They were two huge animals similar to the elephant, being ten or twelve feet high. Their skeletons have been found in different parts of the country.

5. A race of Indians living in New Mexico. Unlike other Indians, they built immense houses of stone, dressed neatly, and lived in families. They possessed some skill in various arts.

6. The snow-shoe and the birch canoe.

7. Lief Erickson sailed to Labrador in 1001. He explored the coast of New England. A year later his brother Thorwald made a voyage to Massachusetts, and is said to have died at Fall River. Another brother, Thorstein, arrived with a small company in 1005, and in 1007 Thorfinn Karlsefne explored the coast still farther south, probably to Virginia.

8. The coast of Massachusetts.

9. The first colony was planted upon the Isthmus of Darien in 1510. Balboa was its governor. He discovered the Pacific Ocean in 1513.

10. The West India Islands had been colonized by the Spaniards. In 1517 Cordova discovered Mexico, and his tale of the wealth of the Mexicans excited the Spaniards, who determined to possess this wealth. For this purpose an expedition was sent under Cortez, who after a contest of two years subdued the people, and the whole empire became a Spanish province.

11. Pizarro, a follower of Balboa, discovered Peru in 1524, and after much bloodshed conquered it in 1532.

12. He circumnavigated the globe in 1577.

13. San Salvador, Guanahani, Cat Island.

14. Three times; at Valladolid, St. Domingo, and Havana, where he now lies.

15. In the summer of 1608 Samuel Champlain sailed down the St. Lawrence, and planted the first permanent settlement on the site of Quebec. Later he ascended the Richelieu River, and discovered the lake which bears his name. He had strong religious sentiments, and was zealous in behalf of the Jesuit missionaries who had come to convert the Indians.

16. An assembly whose members were representatives sent from the various plantations in Virginia.

17. Virginia Dare, the first white child of English parents, was born on the Island of Roanoke, August 18, 1587.

18. They were indolent, improvident, and dissolute.

19. Those who came over in the Mayflower and formed the Plymouth Colony were Pilgrims. The Massachusetts Bay Company, who came ten years later, were the Puritans.

20. When the Mayflower started from England she was accompanied by another vessel, named the Speedwell; the latter proving unseaworthy, was put back to port.

21. An organized company of Amsterdam merchants who had the exclusive privilege of planting settlements in America.

22. To the settlement founded by Roger Williams, and the one founded by Anne Hutchinson and her followers on an island in Narragansett Bay.

23. George Fox was the founder of the Quaker sect, and William Penn was one of the most influential among his converts. Charles

the Second gave Penn a grant of land west of the Delaware, and the province was named Pennsylvania.

24. The name applied to what is now Nova Scotia and a part of New Brunswick.

25. In 1587 Raleigh sent a company of Englishmen and their families to Virginia.

26. This colony settled on the island of Roanoke, with John White for their governor. The Indians threatened them, and White returned to England for help. On account of wars it was three years before he could get back to Virginia, and then not a trace of the colony was to be found

27. The Indians in trying to pronounce the word English called it Yankese, and from that came Yankee.

28. John Elliot.

29. Henry Hudson.

30. A bundle of arrows wrapped in a rattlesnake's skin. The governor accepted it, and returned the skin filled with powder and shot.

31. Gov. Fletcher of New York held a commission, giving him command of the militia of Connecticut. The Legislature refused to acknowledge Fletcher's authority, and when he had the militia drawn up in a line at Hartford, under Captain Wadsworth, and attempted to read his commission, the drums were beaten. Fletcher tried to stop them, but Wadsworth boldly stepped up and said, "Sir, if they are again interrupted, I'll make the sun shine through you in a moment." Fletcher seeing it was useless to assume further authority, returned to New York.

32. Peregrine White.

33. Twenty-four dollars.

34. A part of New Jersey was sold to the Quakers, the divisions being called East and West Jersey, and when spoken of together, "The Jerseys."

35. When Charles II. was a refugee, the Virginians sent a message inviting him to come over and be their king. After he was restored to his throne, in gratitude to the colonists, he caused the arms of Virginia to be quartered with those of England, Scotland, and Ireland, as an independent member of the Empire. From this circumstance Virginia received the name of "The Old Dominion."

36. A persecuted sect of Christians from Austria, who settled in Georgia.

37. It was land deeded by the Indians to the successors of Penn, granting as much land in a certain direction as a man could walk over in a day and a half. By laying out a road and training men to walk, an undue advantage was taken of the Indians.

38. In the Mississippi River.

39. There had been a growing discontent in Virginia, on account

of the oppressive measures of Governor Berkeley. This added to Indian depredations led to a rebellion at the head of which was Nathaniel Bacon. His support became so powerful that Berkeley was obliged to give him a commission to fight the Indians; but after he had gone, Berkeley proclaimed him a traitor, and took up arms against him. With an armed force Bacon returned, took the city of Jamestown and burned it. A short time after Bacon died, and the rebellion subsided.

40. At the first mint for coining silver money established in Massachusetts, the threepence, sixpence, and shilling sterling had stamped upon one side of them the effigy of a pine-tree; hence these pieces were called pine-tree money.

41. He was governor of New York from 1674 to 1683. In 1686 he was made governor of all New England by James II. Andros was a tyrant, laying restraints upon freedom of the press and marriage-contracts, and extorting money in every possible way. As the people were about to resist him, James II. was driven from the throne. The people of Boston made Andros prisoner, and sent him to England charged with maladministration of public affairs.

42. King William's war was caused by difficulties between England and France. The French colonies, enforced by a large body of Indians, began warfare against the English in New York and the New England States. The English colonists united in retaliation, trying to take Quebec and Montreal, but did not succeed. The war lasted eight years, and during this time the French committed many heartless cruelties. Four years later England was involved in war with France and Spain, and the English colonies were compelled to fight both the French and Spanish. This is known as Queen Anne's War. Indian warfare again began, and villages were destroyed, and men, women, and children murdered. This time the New England colonists were more successful. In 1744 King George's War occurred. England and France again took up arms, and were quickly followed by their colonists. The most important siege was the capture of Louisburg, a Canadian fortress, by the English.

43. In 1614 Fort Nassau, just below Albany; in 1623 Fort Orange, on the site of Albany; in the same year Fort Amsterdam, on the site of the Battery; and in 1651 Fort Casimer, on the present site of New Castle.

44. They subjugated the Swedes, adding their domain to New Netherland.

45. The Dutch became jealous of the growing power of the Swedes, who, they thought, were encroaching on their territory. When the Swedes took Fort Casimer, the Dutch began preparations for an immediate attack.

46. Indian money. It consisted of little tubes made of shells and strung in chains or fastened upon belts. It was used in traffic and treaties.

47. A confederacy composed of five powerful Indian tribes oc-

cupying land within the present State of New York. Later they were joined by the Tuscaroras, and from that time were known as the Six Nations.

48. Benjamin Franklin. For a great many years he issued an almanac called "Poor Richard's Almanac."

49. It was a fortified building made of logs, built two stories high, the second story projecting over the first. There were narrow openings through which they might fire muskets, and sometimes openings for cannons.

50. William Kieft and Peter Stuyvesant.

51. A company of London merchants and Virginia land-speculators, to whom was granted a large tract of land on the banks of the Ohio, with an exclusive right of traffic with the Indians.

52. Louisburg is on Cape Breton Island; Ticonderoga is in the northeastern part of New York, on Lake Champlain; Fort Du Quesne was located where the city of Pittsburg now stands.

53. Louisburg and Fort Du Quesne.

54. The capture of Montreal and all other French posts in Canada.

55. Pontiac, an Indian chief, had been an early ally of the French, but afterwards professed friendship toward the English. Growing jealous of their increasing power, he formed a confederacy with other tribes to exterminate the English west of the Alleghanies, but the Indians were speedily subdued.

56. The French inhabitants of Acadia refused to take the oath of allegiance to England, so the English soldiers were sent to remove the Acadians. Some were compelled to march to the seashore and embark in boats, others to retreat into the woods. In the confusion families were separated, and 7000 people made homeless.

57. Thomas Faucett, one of his own soldiers.

58. Canada and all of the French possessions east of the Mississippi, except some fishing-stations near New Foundland.

59. He was one of the boldest pioneers of the West. He went over the mountains as early as 1769, and several years later he made a settlement which was named Boonesborough.

60. He was murdered by an Indian.

61. They were search-warrants allowing the king's officers to enter any store or private dwelling to search for and seize foreign merchandise on which duty had not been paid, and compelling sheriffs to assist in this work.

62. In November of 1765. It was repealed on the 18th of March, 1766.

63. They were blue, and were to be attached to all paper or parchment on which a legal instrument was written.

64. Two pounds.

65. Faneuil Hall, Boston.

66. "Cæsar had his Brutus, Charles I. his Cromwell, and George III.—may profit by their example. If that be treason, make the most of it."

67. After the destruction of the tea in Boston Harbor, Parliament ordered the port of Boston to be closed against all commercial transactions, and the custom-house, courts of justice, and all public offices to be removed to Salem.

68. Philadelphia, New York, and Boston.

69. Colonists who were loyal to the king.

70. General Warren.

71. It was composed of thirteen red and white stripes, symbolizing the thirteen revolting colonies. In one corner was the device of the British flag—a combination of the crosses of St. George and St. Andrews.

72. Congress having no funds at command was obliged to issue bills of credit, for the payment of which they pledged the public faith. This was called Continental money. At first it passed for full value, but so many bills were issued that at last seventy-five dollars in Continental money were worth but one dollar in specie.

73. Thomas Jefferson.

74. John Adams and Benjamin Franklin.

75. It was received everywhere with enthusiastic applause and general rejoicing.

76. It gave them experience, and showed them their strength and the necessity of united effort.

77. The white cross in the corner which marked the British flag was changed to thirteen white stars upon a blue groundwork.

78. In April of 1777, Governor Tryon, at the head of two thousand British and Tories, marched to Danbury, Conn., burned the town, destroyed a large quantity of stores, and cruelly treated the inhabitants.

79. Colonel Meigs, with less than two hundred men, crossed Long Island Sound from Connecticut in whale-boats, attacked a British provision-post at Sag Harbor, burned the store-house and a dozen vessels, and took ninety prisoners without losing a single man. A short time later, one dark night, Colonel William Barton with a few picked men crossed Narragansett Bay, passing through a British fleet, and went to the house where General Prescott, the British commander on Rhode Island, was sleeping, took him from his bed, and made him prisoner. He was afterwards exchanged for General Charles Lee.

80. In the summer of 1778, Colonel John Butler, with a large number of Tories and Indians, entered the valley of Wyoming. Most of the few hundred men who had been left to defend the valley were killed, and the remainder were obliged to surrender, the invaders agreeing to humane terms. But as the families were returning to their homes from Forty Fort, wherein they had sought

safety, the Indians broke the treaty, and before night the whole valley was a scene of smoking ruins and murder.

81. General Anthony Wayne, so called because of his daring.

82. John Paulding, David Williams, and Isaac Van Wart, three young militiamen, all residents of Westchester County. Congress voted each a silver medal and a pension of $200 a year for life.

83. Vessels owned by private individuals, and licensed by the government to prey upon the enemy's commerce.

84. Benjamin Franklin, Patrick Henry, John Adams, Thomas Jefferson, James Otis.

85. General Lafayette, Baron Steuben, Baron De Kalb, Count Pulaski, Count De Rochambeau, Count D'Estaing.

86. By the census of 1790 it was 3,929,214.

87. The campaign against Burgoyne.

88. Thirty-six dollars.

89. Nearly eighty millions of dollars.

90. North Carolina and Rhode Island, because they did not ratify the Constitution until after his inauguration.

91. The Federalists favored the concentration of power in the Federal Government; the Democrats desired its distribution among the people.

92. In the city of New York.

93. They were very dignified in their manners. The gentlemen wore three-cornered cocked hats, coats with silver buttons, knee-breeches, and pointed shoes. Ladies wore stiff brocades, tall hats, and high-heeled boots. They made very deep bows, and all fashions were marked by formality and etiquette. Washington drove to the sessions of Congress in a coach drawn by four horses on ordinary occasions, on great occasions by six. He held public receptions once in two weeks, and Mrs. Washington had evening levees, at which all appeared in full-dress.

94. Benjamin Franklin.

95. A right to search American vessels for supposed deserters, and to carry away the suspected without hindrance. It was claimed by Great Britain.

96. They met American vessels, seized the merchandise, and held the seamen in order to procure ransom-money.

97. In a naval engagement between the Shannon and the Chesapeake, at the mouth of Boston Harbor, Captain Lawrence of the Chesapeake was killed. As he died he exclaimed, "Don't give up the ship!"

98. Winfield Scott.

99. The battle of New Orleans.

100. Commodore Perry. "We have met the enemy, and they are ours."

101. It was the period between the time that peace was declared with Great Britain and the contest about slavery began. Monroe was at the head of the government. He was ably assisted by a strong cabinet, and general prosperity reigned.

102. Indiana, so named from the Indians, was made a State in 1816. Illinois was a part of Indiana, and came from the name of an Indian tribe meaning "The Men." Mississippi and Alabama were formed from Mississippi Territory, Mississippi meaning "The Great River." Missouri was formed from Louisiana Territory, and means "Muddy Waters." Maine was formed out of Massachusetts, and named in honor of Henrietta Maria, Queen of Charles I., who owned the province of Maine in France.

103. To their famous debate in the United States Senate, when Hayne appeared as the champion of State rights, and Webster as the advocate of constitutional supremacy.

104. The Whigs.

105. If foreign governments did not keep up to their agreements, Jackson assumed a hostile tone which compelled them to perform their duty.

106. In 1850 General Lopez wished to invade Cuba and rid the island of Spanish bondage, but he was not supported because it was in violation of existing laws. Several months later, however, Lopez left New Orleans with nearly five hundred men and landed in Cuba. They were soon dispersed, and Lopez with six of his followers was executed.

107. The politicians in the Slave States resolved to form a vast empire with its centre at Havana, reaching northward to Pennsylvania and south to the Isthmus of Darien. South Carolina took the lead, and was followed by Mississippi, Florida, Alabama, Georgia, Louisiana, and Texas; and a Southern Confederacy was formed by delegates from these States, with the title of Confederate States of America. It was wholly the act of politicians, and was never submitted to the judgment of the people.

108. Abraham Lincoln was born in Kentucky. He received but little education, and at the age of nineteen was a hired hand on a boat in New Orleans. He afterwards settled in Illinois, and was clerk in a store. In 1834 he was elected a member of the Illinois Legislature. Two years later he began to practise law. In 1846 he was elected to Congress, and in 1861 was made President.

109. William H. Seward.

110. He tore down the secession flag that was floating over the Marshall House in Alexandria, Va., and as he was descending the stairs was shot dead by the proprietor.

111. The Monitor foundered at sea in a storm on her way to the South; the Merrimac was blown up by the Confederates.

112. West Virginia was separated from the "Old Dominion,"

and admitted as a State at the request of the inhabitants, who were loyal throughout the war.

113. In 1863 Congress placed the entire resources of the country in the hands of President Lincoln, and a conscription act was passed by which men could be called to the field at his discretion. He called for a draft of 300,000 men; and on the day the draft was to begin in New York City there was a terrible riot. The rioters were mostly foreigners, and their violence was chiefly directed against the colored population.

114. He was captured in Georgia, while flying in disguise to the swamps. The government had offered $100,000 for his arrest. He was imprisoned at Fortress Monroe, but never tried.

115. The Emperor of France overawed the Mexicans with a French army, and set up an Empire. In 1864 he conferred the crown on Maximilian, Archduke of Austria. The United States rebuked France for violating the Monroe Doctrine; and Napoleon becoming alarmed, withdrew his army, and Maximilian was taken prisoner and executed.

116. Friday, September 24, 1869, certain brokers of New York City attempted to get control of the gold market, advance the price, then sell out and retire with their accumulated millions. Their scheme was prevented by the issuing of four millions from the sub-treasury, but it was several months before the business of the country recovered from the effects of the excitement.

117. In October of 1871 a great fire broke out in Chicago. The greater part of the city was burned, and two hundred million dollars' worth of property destroyed.

118. Washington, 1789–1797; John Adams, 1797–1801; Thomas Jefferson, 1801–1809; James Madison, 1809–1817; James Monroe, 1817–1825; John Quincy Adams, 1825–1829; Andrew Jackson, 1829–1837; Martin Van Buren, 1837–1841; William Henry Harrison and John Tyler, 1841–1845; James K. Polk, 1845–1849; Zachary Taylor and Millard Fillmore, 1849–1853; Franklin Pierce, 1853–1857; James Buchanan, 1857–1861; Abraham Lincoln, 1861–1865; Andrew Johnson, 1865–1869; Ulysses S. Grant, 1869–1877; Rutherford B. Hayes, 1877–1881; James A. Garfield and Chester A. Arthur, 1881–1885; Grover Cleveland, 1885–1889; Benjamin Harrison, 1889.

119. Harrison, Taylor, Lincoln, and Garfield.

120. Tyler, Fillmore, Johnson, and Arthur.

121. John Adams and John Quincy Adams.

122. Andrew Jackson.

123. Washington and Jefferson.

124. The Louisiana Purchase in 1803, for which they paid 11¼ millions; the Spanish cession of Florida in 1819, about 5 millions; the several Mexican cessions 1845, total, 18½ millions; the Gadsden Purchase in 1853, 10 millions; Alaska in 1868, 7⅕ millions.

125. Slavery was abolished, the negroes were made citizens, the unity of the nation was preserved.

126. By imposing a tax on the manufacture of spirituous liquors and duties on goods imported into the country.

127. Most of them were governed as royal provinces ; some made their own laws subject to the approval of the proprietors. In Rhode Island and Connecticut no authority was reserved by the king, and a representative government was wholly in the hands of the people.

128. Daniel Webster, Alexander Hamilton, Henry Clay, and William H. Seward , Washington Irving, Nathaniel Hawthorne, Bancroft, and Longfellow ; Daniel Webster, Wendell Philips, Edward Everett, and Charles Sumner ; Winfield Scott, Sherman, Sheridan, and General Grant.

129. In 1792 in Philadelphia.

130. It was a Confederation of States, each State retaining its sovereignty and independence. There was but one department to the general government. This was a Congress of delegates from the States. It was changed because Congress had no power to tax, no power to regulate commerce, no power to enforce its demands upon the States, and there was no judiciary.

131. In invention and in manufacture.

132. John Jay, Oliver Ellsworth, John Marshall, Roger B. Taney, Salmon P. Chase, Morrison R. Waite, Melville W. Fuller.

133. Towards the close of 1835, Osceola, chief of the Seminoles, made war upon the frontier settlements of Florida. He baffled the skill of the United States' troops for four years, but was at last captured. He died in prison at Charleston ; Tecumseh and the Prophet were brothers. In 1811 they united in depredations against the frontiers, but were repulsed in the battle of Tippecanoe. Black Hawk was a Sac chief. In 1832, at the head of some western tribes, he commenced warfare upon the frontier settlements of Illinois. Black Hawk was made prisoner, and taken to Washington. From thence he was taken on a trip through the East, that he might see the strength of the nation he had made war with. Red Jacket was the last great chief of the Senecas. Their possessions in New York State were sold in 1838; Powhatan was the father of Pocahontas. He was chief sachem when the English first settled on the James River, and was friendly to the whites.

134. Ohio, Indiana, Illinois, Michigan, and Wisconsin from the Northwest, and Tennessee from the Southwest.

135. Vermont in 1791.

136. Spanish and English coins.

137. Emigration has flowed at the rate of about a million every ten years for the present century, and there were (1880) 14,000,000 people of foreign parentage in the U. S. This large influx has caused a very rapid development of the newer parts of the country, thus enlarging internal commerce and industry.

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CHAPTER IV.

GRAMMAR.

For Third Grade.

1. Define a sentence.
2. Define subject. Predicate.
3. Name the four kinds of sentences. Give an example of each.
4. What is a phrase? Give an example.
5. Define an attribute or complement.
6. What is a direct object? What an indirect object?
7. Define an adjunct or modifier.
8. What is a logical subject? A grammatical subject? A logical predicate? A grammatical predicate? Give examples of each.
9. What are connectives?
10. When is a word in apposition?
11. What is an expletive? Give the words that are so used.
12. Define a noun. A pronoun. A verb. An adjective. An adverb. A preposition. A conjunction. An interjection.
13. What is an object complement? Give an example of one.
14. What is a participle?
15. What is an infinitive?
16. Illustrate what is meant by the natural order and

by the inverted or transposed order of words in a sentence.

17. Classify phrases according to the following scheme :

Phrases { According to Use or Office { / According to Form { /

ANALYZE THESE SENTENCES.

18. He was predisposed to think ill of all causes requiring many words.

19. Tell me, my soul, can this be death?

20. They shall be an abhorring to all flesh.

21. Wouldst thou demolish a driven leaf?

22. His going to England at such a time must have been a public action.

23. A bird in the hand is worth two in the bush.

24. Worn out by age and long confinement, the prisoner was at last set free.

25. The king's persisting in such designs was the height of folly.

26. To profess regard, while inwardly full of contempt, is the action of a sycophant.

27. Saul, yet breathing out threatenings and slaughter, went unto the high-priest.

28. The laurel wreath, the prize of happier years, will not avail thee now.

29. Venture to be wise.

30. I purpose coming home at ten o'clock.

31. To be wise in our own eyes, to be wise in the opinion of the world, and to be wise in the sight of the Creator, are three things so different as rarely to coincide.

32. It is vain to pretend ignorance of the fact.

33. He gave me a letter to read.

34. Who are you?

35. The neglect to lay down in distinct terms the opposition between the true and the false has been the occasion of the generally unintelligible character of metaphysics.

36. There is a pleasure in being alone after the excitement of much society.

37. The world deals good-naturedly with good-natured people.

38. The snow melts, the sun having risen.

39. The sea appears smooth.

40. The desire to go abroad is common to all Americans.

41. She stoops to conquer.

42. The dividends are paid twice a year.

43. To be, contents his natural desire.

44. What ! art thou still at it?

45. How far that little candle throws his beams!

46. By and by it grew very hot.

47. John ordered them to return the hat.

48. The messenger was bidden to run quickly.

49. Give us this day our daily bread.

50. How do you do?

51. Come here.

52. The chief art of learning is to attempt but little at a time.

53. He paid a hundred dollars for it.

54. Is it worth your while to go?

55. The land was ploughed by the farmer in September, under great difficulties and in a workmanlike manner, with a team of ten yoke of oxen.

56. The wall is three feet high.

57. A man is a man for all that.

58. There is a man here wishing to see you.

59. The State of New York has a population of over 5,000,000.

60. A man has no more right to say an uncivil thing than to act one.

61. From peak to peak, the rattling crags among,
Leaps the live thunder.

62. Oliver Twist's ninth birthday found him a pale, thin child, somewhat diminutive in stature, and decidedly small in circumference.

SYNTHESIS.

63. Write three sentences; one having a compound subject, one having a compound predicate, one having a compound object.

64. Write a sentence containing an absolute phrase.

65. Construct a sentence, having a noun in apposition to the object.

66. Construct a sentence having a phrase in apposition to the subject.

67. Write a sentence having a participle as a modifier of the subject.

68. Write a sentence having a prepositional phrase modified by an adverb.

69. Construct a sentence having a phrase in apposition to the object.

70. Construct a sentence having a participial phrase as an attribute.

71. Write a sentence having a participle used only as a noun.

72. Write a sentence containing a participle used merely as an adjective.

73. Compose a sentence having a participial phrase used absolutely.

74. Write a sentence containing a participial phrase,

the participle having an object modified by a participial phrase.

75. Write a sentence having the active form and change it to the passive form.

76. Write a sentence and let the subject be modified by a prepositional phrase, the principal word of which is modified by a prepositional phrase.

77. Compose a sentence containing all the parts of speech, underscore each and write its name above it.

78. Write a sentence containing an infinitive used as an adverbial modifier.

79. Write a sentence containing an infinitive used as an adjective modifier.

80. Construct a sentence having an infinitive as a subject.

81. Construct a sentence having an infinitive used as an attribute.

82. Compose a sentence having an infinitive phrase used as the object of a preposition.

83. Construct a sentence having an infinitive phrase for its subject and an infinitive phrase for its attribute.

84. Compose a sentence having an infinitive phrase used in apposition.

85. Write a sentence containing an infinitive phrase used independently.

86. Write a sentence containing a participle, and change it into an infinitive.

87. Construct a sentence containing an infinitive, and change it into a participial phrase.

COMPOUND AND COMPLEX SENTENCES.

88. Define a clause. Give an example.

89. Classify sentences according to the following scheme:

Sentences { According to Form { / According to Thought { /

90. Define a principal clause. A subordinate or dependent clause. Give an example of each.

91. When are clauses coördinate? Illustrate.

92. What is an adjective clause? What an adverbial clause? What a noun clause? Give an example of each?

93. What is a complex sentence? Give an example of one.

94. What is a compound sentence? Give an example of one.

95. Give a list of conjunctions used to connect independent clauses.

ANALYZE THESE SENTENCES.

96. Wherever I go, I hear the same story.

97. He took care to place himself where he could see all that went on.

98. I will do it as often as you wish.

99. She is older than she looks.

100. The mail train, which usually is so punctual, was late yesterday.

101. The captain, who is a man that I can trust, told me so last night.

102. Tell me not, in mournful numbers,
Life is but an empty dream.

103. I have said what I have said.

104. How far I have succeeded is for you to judge.

105. Let me know when you can come.

106. What he lacks in knowledge, he supplies by self-confidence.

107. What can't be cured must be endured.

108. She loved me for the dangers I had passed.

109. And e'en while fashion's brightest arts decoy,
The heart, distrusting, asks if this be joy.

110. He ran so fast that I could not overtake him.

111. He is as heavy as I am.

112. Though He slay me, yet will I put my trust in Him.

113. Does such a scholar as he is read books?

114. I will lend you the book if I can find it.

115. He did as much as he could, but he did not do as much as he wished to do.

116. "Once as I told in glee
Tales of the stormy sea,
Soft eyes did gaze on me,
Burning yet tender;
And as the white stars shine
On the dark Norway pine,
On that dark heart of mine
Fell their soft splendor."

117. He never lends a pencil, although he has a dozen.

118. Let him that is without blame cast the first stone.

SYNTHESIS.

119. Compose a sentence containing a substantive clause used as a subject.

120. Compose a sentence having a substantive clause used as a direct object.

121. Compose a sentence having a substantive clause used as an attribute.

122. Write a sentence containing two coördinate adjective clauses.

123. Compose a sentence containing an adverb clause.

124. Write a sentence containing an adverb clause and change the adverb clause to a prepositional phrase.

125. Write a compound sentence and change it into a complex sentence.

126. Write a simple sentence having its object modified by a participial phrase and change the phrase into an adjective clause.

127. Expand the participial phrase in the following sentence into an adverb clause, and then expand the phrase into an adjective clause: A fool, holding his peace, is counted wise.

128. Write a sentence containing a clause in direct quotation and then change it to indirect quotation.

129. Illustrate the number of ways you can use the word *playing* as a different part of speech.

130. What words are used to introduce noun clauses?

NOUN AND PRONOUN.

131. Write the plural of *wharf, axis, focus, cherub, phenomenon.*

132. What distinction is made in the use of the relatives *who, which,* and *that* ?

133. Write the declension of *ox, child, knife, woman.*

134. What are the plurals of *radius, parenthesis, brother-in-law.*

135. Give the possessive plural form of *motto, lady, thou, man.*

136. Give the correlatives of *lad, empress, czar, Francis.*

137. Tell how the plural of each of these words is formed : *elegy, church, piece.*

138. Define or describe each of the following terms: person, number, gender, case.

139. Give a definition of each kind of pronoun.

140. Write the feminine of *nephew, hero, baron, benefactor, man-servant.*

141. Write the masculine of *belle, filly, lass, nun, roe, witch, hind, arbitratrix.*

142. Give the rule for forming the plural of each of these nouns : *lady, valley, cargo.*

143. Write ten nouns having no plural.

144. Write ten nouns having no singular.

145. Indicate the plural of +, 2, *t.*

146. Write ten nouns having the same form in both numbers.

147. When is *thou* used?

148. What is a collective noun? What an abstract noun? Give three examples of each.

149. What is an antecedent? Give an illustration.

150. What pronouns indicate gender?

151. Give all the forms in which *who* is compounded.

152. Which of the relative pronouns are indeclinable?

153. Change these to the possessive form: The rigging of the man-of-war. The yacht of the Prince of Wales. At the store of Hawkins & Jones.

ADJECTIVE AND ADVERB.

154. Define an adjective. An adverb.

155. What are pronominal adjectives?

156. Write a sentence in which a noun shall be used as an adverb.

157. How are adverbs often formed from adjectives ?

158. Compare *bad, beautiful, heavy, many.*

159. Give the two positives of *worse* and those of *most.*

160. Compare *three* adjectives so as to show *three methods* of comparison.

161. What is the general usage of *an* before a word beginning with an *h* sound?

162. Are *an* and *a* the same or different articles?

163. Name several adjectives that do not admit of comparison.

THE VERB.

164. Define a verb.

165. Classify verbs, using the following scheme:

Verbs { According to Transition { } ; According to Formation of Principal Parts { }

166. Define each class, and give examples.

167. To what class does the verb *be* belong?

168. What is meant by the principal parts of a verb?

169. What is an auxiliary verb?

170. Name the voices of verbs, and define each.

171. Define mood or mode.

172. Name the moods or modes and define each.

173. What is tense?

174. Name and define the tenses. Give examples of each.

175. What signs have the tenses?

176. What is conjugation?

177. Do you know thoroughly the conjugation of the verb *to be?* Write it out.

178. What is meant by the synopsis of a verb?

179. Write the synopsis of the verb *love.*

180. Name the infinitives and give an example of each.

181. Give the principal parts of *read, bid, drink, chide, choose, skim, hang, lay, lie, swim, take, thrive, tear, tread, work.*

182. Change the third person singular present indicative active of the verb *bring* to the corresponding passive form.

183. Give the third persons pluperfect indicative active of the verb *go.*

184. How is a verb conjugated negatively?

185. How is the passive voice of a verb formed?

186. What are the signs of the modes?

187. Give ten verbs that take the infinitive after them without the preposition *to*.

SYNTAX.

188. Define syntax.

189. What is meant by government? What by agreement? Give an illustration of each.

190. Compose sentences to illustrate the following rules:

Two or more singular subjects taken separately require the verb to be in the singular.

191. Collective nouns, though singular in form, take a plural verb if the predicate applies to objects taken individually.

192. The verb *be* has the same case after it as before it.

193. When a verb has two or more subjects connected by "and," it must agree with them in the plural.

194. Write this sentence four times, giving *only* a different position in each, and state exactly what each sentence means. "Only he mourned for his brother."

195. State the difference in meaning of "A portrait of my father," and "A portrait of my father's."

196. Supply the omitted word or words in each sentence, and give reasons for the form you use:

Either you or I . . . in the wrong.

If you were here you would find two or three in the parlor after dinner wh— you would say, passed their afternoons very agreeably.

Hoping that I . . . soon hear from you, believe me, yours truly.

CRITICISM.

Change these sentences to correct syntax, and justify in each instance your correction:

197. It is time we went.

198. Peter's, John's, and Andrew's occupation was that of fisherman.

199. He invited my brother and I to see his library.

200. She would not accept the jewels, though she was offered them.

201. Bad men they often honor virtue at the bottom of their hearts.

202. They were troubled with the mosquitoes.

203. The book was read by the old and young.

204. I received a letter from my cousin, she that was here last week.

205. Where are the Martins? I believe that is them coming behind us.

206. Those kind of injuries we need not fear.

207. The Scriptures are more valuable than any writings.

208. She bought a new pair of gloves.

209. Every one must judge of their own feelings.

210. This is the student who I gave the book to.

211. We knew it to be he.

212. It could not have been her.

213. Who is there? It's me. Who's me?

214. Now remember this is between you and I.

215. I do not doubt but that it is true.

216. The clergyman read the two first stanzas of the hymn.

217. The velvet feels smoothly.

218. I recollect you was his advocate in that important trial.

219. I feel badly.

220. In the camp of Israel every man and every woman were numbered.

221. There are a class of men who never take forethought.

222. I had wrote to him the day before.

223. The books were lain upon the table.

224. She dare not oppose it.

225. Circumstances alters cases.

226. He need not trouble himself.

227. What have become of your cousins?

228. By laying abed in the morning one loses a tenth part of one's time.

229. Lay down and rest.

230. There goes Mr. and Mrs. Smith.

231. How is your father and mother?

PARSING.

Parse the italicized words in the following sentences:

232. *Romans,* countrymen, and lovers! hear me for my cause, and be *silent* that you may hear; *believe* me for mine honor, and have respect unto *mine* honor, that you may believe; censure me in your wisdom, and awake your senses that you may the *better judge.*

233. The illustrated *library* of travel, exploration, and adventure has been the *means* of *furnishing* the *public* with much information *bearing* upon geography, history, and *customs* of distant and partially *unknown* countries.

234. John chased the man a *mile,* called him a *knave,* and struck *him* a *blow.*

235. *There* were five men *there.*

236. "I *still* had hopes, *for* pride attends us *still.*
Amidst the swains to show my book-learned skill."

237. I must pause *till* it *come back* to me.

238. I will run *as far as* God has any ground.

239. The door stands *open.*

240. The ship went *ashore just* below Barnegat.

For Second Grade.

1. Name eight different kinds of adverb clauses.

2. Give a list of conjunctions used to connect subordinate clauses to principal clauses.

3. Name five ways in which a noun clause may be used.

ANALYZE THESE SENTENCES.

4. Nero was fiddling when Rome was burning.

5. As I am a living man here comes my brother.

6. Having first procured our guides, we began the ascent of the mountain.

7. 'Tis sweet to hear the watch-dog's honest bark.

8. A wise ruler does not subject a good subject to unnecessary taxation.

9. What did Henry do?

10. The fact that man's powers are limited is not sufficiently recognized.

11. He was generally master of what he undertook.

12. The ship was loaded and sailed from port.

13. The ship, when it had been loaded, sailed from port.

14. The ship which had been loaded sailed from port.

15. How dear to my heart are the scenes of my childhood.

16. Is it worth while for us to go?

17. In the same year, Hudson's ship, the Half Moon, was also sent to the Hudson river on a like errand by the company.

18. How many trees are there in that lot?

19. Either keep still or go out.

20. That fortune favors the brave is often proved true.

21. He whistled as he went.

22. In speaking of Smith's farm, mine is twenty acres larger.

23. The people elected Garfield President.

24. He painted the house yellow.

25. As I am pressed for time, I can say no more at present.

26. Ask the carpenter to plane the board true.

27. Mark, now, how a plain tale shall put you down.

28. In the late war the soldiers called the stars and stripes "Old Glory."

29. He that fights and runs away,
May live to fight another day.

30. He worked his hand sore.

31. Sir Isaac Newton drew close to the grate in which a fire had just been kindled.

32. The success was as great as he expected.

33. He was so successful that he was able to retire from business.

34. Withdraw thy feet from thy neighbor's house, lest he be weary of thee and so hate thee.

35. The harvest is abundant, therefore we will rejoice and be glad.

36. The daughter is as old as the mother was twenty years ago.

37. Such neighbors as these neighbors have shown themselves to be, are neighbors indeed.

38. The North River was called the *Hudson* in honor of its discoverer, and the South River was called the *Delaware* in honor of Lord De La War, one of the original proprietors of that region.

39. A fort once stood where we are now standing.

40. I should call her a simpleton.

41. Plant the seeds deep in the ground.

42. He was elected chairman of the meeting.

43. The captain of the ship anchored her just below the pier.

44. The red-man wondered what awful voice was

speaking amid the wind that roared through the tree-tops.

45. Napoleon ordered that a part of the soldiers should act as prisoners.

46. Fishes can live only in water.

47. And straightway he constrained the disciples to enter into a boat, and to go before him unto the other side.

48. If thou be wise, thou shalt be wise for thyself.

49. For Herod had laid hold on John, and bound him, and put him in prison for the sake of Herodias, his brother Philip's wife.

50. He will come, provided he receives my letter.

51. The true monarchs of every country are those whose sway is over thought and emotion.

52. He called for me, for I was to go with him.

53. I said that I laid down the money to pay the bill.

54. If I do go, will he stay, until I come back?

55. All the triumphs of truth and genius over prejudice and power, in every country and in every age, have been the triumphs of Athens.

56. To appear discouraged is the way to become so.

57. Wait just a moment.

58. He was wonderfully active, considering his age.

59. It is just about a year since I saw what was doing there.

60. Ye shall not eat of it lest ye die.

61. Where'er her troubled path may be,
The Lord's sweet pity with her go.

62. I do not care whether he comes or not.

63. He that hath ears to hear, let him hear.

64. Allowing all this, there is yet something to be said in his favor.

65. There shall not be left one stone upon another, that shall not be thrown down.

66. Except these abide in the ship, ye cannot be saved.

67. I know a bank whereon the wild thyme grows.

68. Defer not till evening what morning may and should accomplish.

69. The young man received ten thousand dollars to begin the world with.

70. The mill will never grind
With the water that is past.

71. He extolled his wares beyond their worth.

72. John is very foolish to take such a thing to heart.

73. To lie down on the pillow after a day spent in temperance, how sweet is it!

74. I know not what course others may take, but as for me, give me liberty or give me death.

SYNTHESIS.

75. Compose a sentence having an adverbial clause of concession.

76. Write a sentence containing a substantive clause used in apposition.

77. Compose a sentence containing an adverb clause of reason.

78. Compose a sentence containing an adverb clause, and change the adverb clause into an infinitive phrase.

79. Write a simple sentence containing an infinitive phrase and change the infinitive phrase into an adverb clause.

80. Illustrate *subject phrase, object phrase, subject clause, object clause.*

81. Write a sentence containing *which* in the plural, nominative case.

UPON THE PARTS OF SPEECH.

82. Give two plurals, and the meaning of each, to these nouns: *Brother, die, index.*

83. Write the possessive plural of *money, penny, talisman.*

84 What two distinct offices are performed by the relative pronoun.

85. When a direct object, what is the position of a relative pronoun with reference to the verb.

86. Write the possessive plural of *sister-in-law, mouse-trap, hanger-on.*

87. Write the corresponding masculine or feminine to these nouns: *Maid, earl, niece, sir, papa, heir, emperor, marquis, testator, duke, Joseph, Charles, widow, nymph.*

88. Write the plurals of these: *sir, madam, bandit, radius, analysis, stratum, genus.*

89. Write correctly in words $\frac{4}{401}$.

90. How can the adjective be distinguished from the noun?

91. Give the adjectives that have a plural.

92. What are the different offices of *that*?

93. Classify and define *cardinals, numerals, ordinals.*

94. Give a classification of adverbs.

95. Give an example of the comparison of adjectives by prefixes and by suffixes.

96. What is a compound verb?

97. Which do you regard the better term, and why? Mood or mode.

98. How are the person and number of verbs determined?

99. Give an example of a verb in the *strong* conjugation and of one in the *weak* conjugation.

100. Write the entire conjugation of the verb *have.* (A test question.)

101. What tense must be used to denote that a certain event will precede some other event referred to?

102. Does the object of a verb influence its person and number?

103. Give the principal parts of *mulct, shear, beat, seethe.*

104. What is a defective verb? What is a redundant verb? Give an example of each.

105. Define a copulative verb.

106. What is an impersonal verb?

107. What is meant when we speak of a finite verb?

108. Write the passive voice of the verb to eat. (Merely a test question.)

109. In the formation of the future tenses what distinction should be made in the use of the auxiliaries *shall* and *will*?

110. What are the compound prepositions?

111. Give some phrases used as prepositions.

112. Give several prepositions derived from verbs.

113. Classify conjunctions and define each class, giving examples.

114. State the difference between a conjunctive adverb and a conjunction.

115. Compose sentences using *that* as a relative pronoun, as an adjective pronoun, as a definitive adjective, as a conjunction.

116. Compose sentences using *but* as a conjunction, as an adjective, as an adverb, and as a preposition.

SYNTAX.

Compose sentences to illustrate the following rules:

117. Two or more singular subjects taken separately require the verb to be in the singular.

118. A noun or pronoun is put absolute in the nominative when its case depends on no other word.

119. A pronoun must agree with its antecedent in number, gender, and person.

120. When an adjective denoting one or more than one

is joined to a noun, the adjective and the noun must agree in number.

121. In using the superlative degree, be careful to make the latter term of comparison, or term introduced by *of*, include the former.

122. When the comparative degree is employed, the latter term of comparison should never include the former.

123. When a verb has nominatives of different persons or numbers, connected by *or* or *nor*, it must agree with that which is placed next to it.

124. When a possessive noun is followed by an explanatory word, the possessive sign is added to the explanatory word only. But if the explanatory word has several modifiers, or if there are more explanatory words than one, the principal word takes the sign.

125. Use *an*, *a*, or *the* before *each* of two or more connected adjectives only when these modify different nouns expressed or understood.

CRITICISM.

Change these sentences to correct syntax, and justify in each instance your correction:

126. Him being on deck, we gave three cheers for the good ship.

127. Will you go to the President's this evening?

128. This is a discovery of Sir Isaac Newton.

129. This is my father's brother's daughter's house.

130. Thee who he had most injured he had the greatest reason to love.

131. You will never have another such a chance.

132. The Alleghany and the Monongahela rivers form the Ohio.

133. I rejoice that there is another and a better world.

134. The water is about six fathom deep.

135. Henry or William will give us their company.

136. Those two boys must not speak to one another.

137. Bismarck is greater than any German statesman.

138. She is such an extravagant woman.

139. Have you Webster and Worcester's Dictionary?

140. Adam was Cain's and Abel's father.

141. I went to Smith's, Brown's and Company's store.

142. I owe thee a heavy debt, and will you not allow me to repay it?

143. Here is a pupil which possesses fine talents.

144. Virtuous effort and not depraved genius win the prize.

145. The fragrant myrtle and sweet-scented woodbine renders the air in this spot truly delicious.

146. Wisdom, virtue, happiness, dwells with the golden mediocrity.

147. In that transaction their safety and welfare is most concerned.

148. When will we three meet again?

149. I intended to have been at home when you called.

150. The flowers smell very sweetly and look beautifully.

151. Did you expect to have heard so poor a sermon?

152. By letters of the third of May, we learn that the West India fleet arrived safely.

153. There were a great number of spectators.

154. What sounds have each of the vowels?

155. The committee have attended to their business.

156. My flesh and my heart faileth.

157. High pleasure and luxurious living begets satiety.

158. We had laid on the ground all night.

159. She is as peevish as a setting hen.

160. After laying a while in this position, he raised up.

161. The man could neither read or write.

162. Which of the group of men is the taller.

163. An account of all the great events in all parts of the world are given in the daily papers.

164. He is a man of remarkable clear intellect.

165. Either you or I are in the way.

166. That is seldom or ever the case.

167. The following treatise, together with those that accompany it, were written several years ago.

168. That is either a man or woman's voice.

169. Of all the other qualities of style, clearness is the most important.

PARSING.

Parse the italicized words in the following sentences:

170. But *when* thou doest *thine* alms, *let* not thy left hand *know what* thy right hand *doeth*.

171. On parent knees, a naked, *new-born* child,
Weeping, thou *sat'st* while all around *thee* smiled;
So *live* that, *sinking* in thy last long sleep,
Thou then may'st smile, *while* all around thee weep.

172. I seem *to have been only like a boy* playing on the sea-shore, and diverting myself in *now* and *then finding* a smoother pebble or a prettier shell *than ordinary, whilst* the great ocean of truth lay beyond.

173. From scenes like *these* old Scotia's grandeur springs,
That makes her loved at home, *revered* abroad;
Princes and lords are *but* the breath of kings,
"An honest *man's* the noblest work of God."

174. *Like* the *leaves* of the forest when summer is green,
That *host* with their banners at sunset are seen.

175. Whence come those *shrieks*, so *wild* and shrill,
That cut like *blades* of steel the air,
Causing the *creeping* blood *to chill*
With the sharp cadence of despair.

176. *When* I was young, I thought of *nothing else but pleasure*.

177. Ye know the heart of a stranger, *seeing ye* were strangers in the land of Egypt.

178. *Even* a fool *when* he holdeth his peace *is counted wise.*

179. The *more* you struggle, the *worse* you are *off.*

180. They are people *worth speaking with.*

For First Grade.

1. What is a factitive predicate? Give two examples.

2. Can subordinate clauses ever be co-ordinate clauses? Give an illustration.

3. Is there any difference between a noun clause and a substantive clause? Verify your answer by illustrations.

4. What is a compound-complex sentence?

ANALYZE THESE SENTENCES.

5. The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh nor whither it goeth.

6. No one who is a lover of money, a lover of pleasure, and a lover of glory, is likewise a lover of mankind; but only he who is a lover of virtue.

7. You stood still while he advanced; for neither of you knew what ought to be done.

8. Had I been as cold-hearted as I sometimes thought myself, nothing would have interested me more than to witness the play of passions that must thus have been evolved.

9. I laid the money which I paid, on the counter, as I said.

10. Whither thou goest I will go; and where thou lodgest I will lodge.

11. I have sinned in that I have betrayed the innocent blood.

12. And forever and forever,
As long as the river flows,
As long as the heart has passions,
As long as life has woes ;

The moon and its broken reflection
And its shadows shall appear,
As the symbol of love in heaven,
And its wavering image here.

13. And we did think it writ down in our duty to let you know it.

14. Unless you are certain that he is there, you should not set out.

15. He erected the wall in order that he might stop trespassing.

16. What I have done remains to be seen.

17. The more we live, more brief appear
Our life's succeeding stages.

18. It is not ours to separate
The tangled skein of will and fate,
To show what metes and bounds should stand
Upon the soul's debatable land,
And between choice and Providence
Divide the circle of events.

19. Every individual has a place to fill in the world, and is important in some respect, whether he chooses to be so or not.

20. If, as poets are wont to whine, the outward world was cold to Shakespeare, its biting air did but trace itself in loveliest frostwork of fancy on the many windows of that self-centred and cheerful soul.

SYNTHESIS.

21. Compose a sentence having an adjective clause containing an adverbial clause.

22. Write a sentence containing an adverb clause, and change the adverb clause into an adjective clause.

23. Compose a sentence having an independent clause joined in the sentence without a conjunction.

24. Write a compound-complex sentence.

25. Illustrate the different positions an adjective clause may occupy in a sentence.

26. Illustrate the different positions an adverb clause may occupy.

UPON THE PARTS OF SPEECH.

27. Give an outline for parsing a noun.

28. In what points does the pronoun agree with the noun?

29. Give an expression containing *other* as a pronoun.

30. What are reflective pronouns?

31. Upon what is gender in the English language based?

32. Distinguish between the co-ordinating and restrictive relative pronouns.

Examine this definition of gender, and express an opinion upon it. Gender is that attribute which the noun derives from the presence or absence of sex, in that which the noun names.

33. Give an example of an adverb occupying the place of an adjective.

34. In what respect do the adjective and the adverb agree? In what respect do they differ?

35. What are *multiplicatives*? Give three examples.

36. What words originally adverbs are now called responsives?

37. In what way are adjectives formed from adjectives?

38. What adverbs are used as prepositions?

39. What are pronominal adverbs, and why so called?

40. What is the difference between a pronominal adjective and a pronoun?

41. Write a sentence containing *what* used as an adverb; a sentence containing *but* used as an adverb.

42. Which of these is the most logical definition of a verb? Give reasons for your answer:

(*a*) "A verb is a part of speech that makes an affirmation."

(*b*) "A verb is a word, or phrase, which, in a sentence, has the use or office of a predicate or affirmer." ("*A predicate or affirmer is a word or a phrase, naming the action, and used to ask or declare something concerning the subject.*")

(*c*) "A verb is a word that asserts or declares."

(*d*) "A verb is a word that asserts action, being, or state of being."

(*e*) "A verb is a word that asserts."

43. Point out in what way transitive verbs become intransitive. Give three examples.

44. Is the infinitive properly a mode? Give reasons for your answer.

45. Which of these sets of names do you deem best for the tenses, and why?—Present, Imperfect, Future, Perfect, Pluperfect, Future-perfect.—Present, Past, Future, Present-perfect, Past-perfect, Future-perfect.—Present, Past, Future, Prior-present, Prior-past, Prior-future.

46. What distinction would you make between the past-participle *drank*, and the form *drunk?* Between *hanged* and *hung?*

47. What difference is there between the infinitive and a participle? Illustrate.

48. Give an example of a verb-phrase.

49. Of what modes was the potential formed?

50. What is a reflexive verb? Give an example.

51. What difference in meaning is there between this passage as given in the Authorized and in the Revised version of the New Testament?—

"If thou *be* the Son of God, command that these stones be made bread."

"If thou *art* the Son of God, command that these stones become bread."

52. What were the original meanings of *shall* and *will?*

53. When is *ought* present and when past?

54. What tenses have the verbs in these sentences? Spring is come. Winter was gone.

55. Write a verb in the present conditional indicative, and in the subjunctive present.

56. What is meant by calling the preposition a word of relation?

57. Wherein do conjunctions and prepositions agree, and wherein do they differ?

58. Mention several phrases serving as conjunctions.

59. What demonstrative adjective is used as a conjunction?

60. Mention words that are both conjunctions and adverbs. How can it be known, in each case, whether a word is an adverb or a conjunction?

61. Distinguish between the uses of *O* and *oh*.

62. Compose sentences using *what* as a relative pronoun, as an interrogative pronoun, as a definitive adjective, as an adverb, and as an interjection.

SYNTAX.

Change these sentences to correct syntax, and justify in each instance your correction.

63. They are both alike.

64. I have quite a number of them.

65. My brother, my sister, and myself will come.

66. Did mankind but love each other, it would be something.

67. I wished really to know.

68. I had rather not do it.

69. If I am not mistaken the number is 26.

70. I have compassion on the multitude because they continue with me three days.

71. A hasty reading would not enable one to discover that this was an essay.

72. Destitute of principle, he regarded neither his family, nor his friends, nor his reputation.

73. When sickness, infirmity, or reverse of fortune affect us, the sincerity of friendship is tested.

74. The committee was divided in its opinions.

75. Each of them in their turn receive the benefits to which they are entitled.

76. Those things in the which I will appear unto thee.

77. The atmosphere's being clear, and my sight good, I beheld the ship standing out to sea,

78. The fact of me being a stranger to him does not justify his conduct.

79. I would be delighted if you would go.

80. What difference is there between "I would do it, if I were you," and "I should do it, if I were you"?

81. What the difference between "I shall now proceed to mention some of the most famous persons of that day," and "I will now proceed to mention some of the most famous persons of that day"?

82. What the difference between "Shall you go to-morrow?" and "Will you go to-morrow?"

ANSWERS TO GRAMMAR, THIRD GRADE.

1. A *sentence* is the expression of a thought in words.

2. The *subject* is that about which the statement is made. The *predicate* is that which is stated or asserted of the subject.

3. *Declarative:* The city was taken by stratagem. *Interrogative:* What can tears avail? *Imperative:* Go ye out to meet him. *Exclamatory:* How fiercely the wind blows!

4. A *phrase* is a combination of words, not including a subject and predicate, having in a sentence the value of a single part of speech. *Through the woods.*

5. The *attribute* or *complement* is the noun or adjective which completes the predicate and belongs to the subject.

6. The direct object is that which receives the action of the verb without the help of any auxiliary word: He gave me the *book.*

The indirect object is the noun or pronoun which is less directly affected by the action of the verb, and may be governed by a preposition: He gave *me* the book.

7. A word which limits the meaning of another word.

8. The subject noun with all its modifiers: *The boisterous winds of March* rage angrily through the trees. The bare subject noun, as *winds.* The predicate verb with all its modifiers, as *rage angrily through the trees.* The bare verb, as *rage.*

9. Words which determine the relation of phrases or sentences to one another.

10. When annexed to another word and denotes the same person or thing.

11. A word whose office is merely to begin a sentence in order to render it less abrupt: *there, why, it.*

12. A noun is a name. A word which supplies the place of a noun. The part of speech which asserts. A word joined to a noun or pronoun to limit its application. A word used to modify a verb, an adjective, or an adverb. A word showing relation between other words. A word used to connect words, phrases, or clauses. A word which expresses strong or sudden feeling.

13. That which completes the predicate and names the object which receives the act: Fulton invented the *steamboat.*

14. A form of the verb commonly ending in *ing* or *ed*, and used like a noun or adjective.

15. A form of the verb denoting an action or state indefinitely, without the limitation of a subject; generally preceded by *to.*

16. The subject precedes the verb; the transitive verb precedes

its object; the adjective precedes the noun. Natural order: This book is dedicated to my dear friend. Inverted order: To my dear friend is dedicated this book.

17. Use { Noun / Adjective / Adverbial } Form { Prepositional / Infinitive / Participial }

18. Simple, declarative sentence containing an infinitive and a participial phrase.
Subject, *he*
Predicate, *was predisposed*
Modifier of predicate, *to think ill of all causes*
Modifier of *causes*, *requiring many words*

19. Compound, imperative sentence. First clause—*Tell me, my soul.*
Subject, *thou* (understood)
Predicate, *tell*
Indirect object, *me*
Phrase in apposition with subject, *my soul*
Interrogative clause—
Subject, *this*
Predicate, *can be*
Predicate noun (complement), *death*

20. Simple declarative sentence.
Subject, *they*
Predicate, *shall be*
Attribute complement, *abhorring*
Modifiers of complement: { *an* / *to all flesh* }

21. Simple interrogative sentence.
Subject, *thou*
Predicate, *wouldst demolish*
Object, *leaf*
Modifiers of object: { *a* / *driven* }

22. Simple declarative sentence.
Subject, *going*
Modifiers of subject: { *his* / *to England* / *at such a time* }
Predicate, *must have been*
Attribute complement, *action*
Modifiers of complement: { *a* / *public* }

23. Simple declarative sentence.
Subject, *bird*
Modifiers of subject: { *a* / *in the hand* }

Predicate, *is*
Attribute complement, *worth*
Modifier of complement, *two in the bush*

24. Simple declarative sentence.
Subject, *prisoner*
Modifier of subject, the participial phrase { *worn out by age and long confinement*
Predicate, *was set*
Modifier of predicate, *at last*
Attribute complement, *free*

25. Simple declarative sentence.
Subject, *persisting*
Modifiers of subject: { *the king's* / *in such designs*
Predicate, *was*
Attribute complement, *height*
Modifiers of complement: { *the* / *of folly*

26. Simple declarative sentence, with infinitive phrase used as sub.
Subject, *to profess regard while inwardly full of contempt*
Predicate, *is*
Attribute complement, *action*
Object of infinitive, *regard*
Modifier of infinitive, the phrase { *while inwardly full of contempt*
Modifiers of complement: { *the* / *of a sycophant*

27. Simple declarative sentence with participial phrase.
Subject, *Saul*
Modifier of subject, the participial phrase { *yet breathing out threatenings and slaughter*
Predicate, *went*
Modifier of predicate, *unto the high-priest*

28. Simple declarative sentence.
Subject, *wreath*
Modifiers of subject: { *the* / *laurel* / *the prize of happier years*
Predicate, *will avail*
Modifiers of predicate: { *not* / *now*
Direct object, *thee.*

29. Simple imperative sentence, with an infinitive phrase.
Subject, *you* (understood)
Predicate, *venture*
Object (a noun phrase), *to be wise*

30. Simple declarative sentence, with a participial phrase.
Subject, *I*

Predicate, *purpose*
Object, the participial phrase (noun phrase) } *coming home at ten o'clock*

31. Simple declarative sentence with a compound subject.
Subjects: { *to be wise in our own eyes*; *to be wise in the opinion of the world*; *to be wise in the sight of the Creator* }
Connective, *and*
Predicate, *are*
Attribute complement, *things*
Modifiers of complement: { *three*; *different* }
Modifier of *different, so*
Modifier of *so, as rarely to coincide*

32. Simple declarative sentence.
Subject, *it*
Predicate, *is*
Complement, *vain*
Infinitive phrase explanatory of the subject, } *to pretend ignorance of the fact*

33. Simple declarative sentence.
Subject, *he*
Predicate, *gave*
Object, *letter*
Modifier of object, *a*
Modifier of predicate, (*to*) *me*
Modifier of *letter, to read*

34. Simple interrogative sentence.
Subject, *you*
Predicate, *are*
Complement, *who*

35. Simple declarative sentence.
Subject, *neglect*
Subject modifiers: { *the*; *to lay down in distinct terms the opposition between the true and the false* }
Predicate, *has been*
Complement, *occasion*
Modifiers of complement: { *the*; *of the generally unintelligible character of metaphysics* }

36. Simple declarative sentence.
Subject, *pleasure*
Modifiers of subject: { *a*; *in being alone* }
Predicate, *is*
Modifier of pred., *after the excitement of much society*
Expletive, *there*

37. Simple declarative sentence.
Subject, *world*
Modifier of subject, *the*
Predicate, *deals*
Modifiers of predicate: { *good-naturedly* / *with good-natured people*

38. Simple declarative sentence with an absolute phrase.
Subject, *snow*
Modifier of subject, *the*
Predicate, *melts*
Absolute phrase, or pred. modifier, *the sun having risen*

39. Simple declarative sentence.
Subject, *sea*
Modifier of subject, *the*
Predicate, *appears*
Attribute complement, *smooth*

40. Simple declarative sentence.
Subject, *desire*
Modifiers of subject: { *the* / *to go abroad*
Predicate, *is*
Complement, *common*
Modifier of complement, *to all Americans*

41. Simple declarative sentence.
Subject, *she*
Predicate, *stoops*
Modifier of predicate, *to conquer*

42. Simple declarative sentence.
Subject, *dividends*
Modifier of subject, *the*
Predicate, *are paid*
Modifier of predicate, *twice a year*

43. Simple declarative sentence.
Subject, *to be*
Predicate, *contents*
Object, *desire*
Modifiers of object: { *his* / *natural*

44. Simple interrogative sentence with an independent element.
Subject, *thou*
Predicate, *art*
Modifier of predicate, *at it*
Modifier of " *still*
Independent element, *what*

45. Simple exclamatory sentence.
Subject, *candle*
Modifiers of subject: { *that* / *little*

Predicate, *throws*
Object, *beams*
Modifier of predicate, *how far*
Modifier of object, *his*

46. Simple declarative sentence.
Subject, *it*
Predicate, *grew*
Complement. *hot*
Modifier of complement, *very*
Modifier of predicate, *by and by*

47. Simple declarative sentence
Subject, *John*
Predicate, *ordered*
Object, *them*
Modifier of object, *to return the hat*

48. Simple declarative sentence.
Subject, *messenger*
Modifier of subject, *the*
Predicate, *was bidden*
Modifier of predicate, *to run quickly*

49. Simple imperative sentence.
Subject, *you* (understood)
Predicate, *give*
Object, *bread*
Modifiers of object: { *our* / *daily*
Modifiers of predicate: { (to) *us* / *this day*

50. Simple interrogative sentence.
Subject, *you*
Predicate, redundant form, *do, do*
Modifier of predicate, *how.*

51. Simple imperative sentence.
Subject, *you* (understood)
Predicate, *come*
Modifier of predicate, *here.*

52. Simple declarative sentence.
Subject, *art.*
Modifiers of subject: { *the* / *chief* / *of learning*
Predicate, *is*
Complement, the noun-phrase, *to attempt but little at a time*

53. Simple declarative sentence.
Subject, *he*
Predicate, *paid*
Object, *dollars*

Modifier of object, *a hundred*
Modifier of predicate, *for it*

54. Simple interrogative sentence.
Subject, *it*
Infinitive explaining subject, *to go*
Predicate, *is*
Complement, *worth*
while, noun in the objective following *worth* to denote value.

55. Simple declarative sentence.
Subject, *land*
Modifier of subject, *the*
Predicate, *was ploughed*
Modifiers of predicate: *by the farmer*, *in September*, *under great difficulties*, *in a workmanlike manner*, *with a team of ten yoke of oxen*

56. Simple declarative sentence.
Subject, *wall*
Modifier of subject, *the*
Predicate, *is*
Complement, *high*
Modifier of complement, *three feet*

57. Simple declarative sentence.
Subject, *man*
Predicate, *is*
Complement, *man*
Modifier of complement, *a*
Modifier of predicate, *for all that*

58. Simple declarative sentence, with participial phrase.
Subject, *man*
Modifiers of subject: *a*, *wishing to see you*
Predicate, *is*
Expletive, *there*
Modifier of predicate: *here*

59. Simple declarative sentence.
Subject, *State*
Modifiers of subject: *the*, *of New York*
Predicate, *has*
Object, *population*
Modifiers of object: *a*, *of over* 5,000,000

60. Simple declarative sentence, with two infinitive phrases in apposition.

Subject, *man*
Modifier of subject, *a*
Predicate, *has*
Object, *right*
Modifiers of object: { *no more* / *to say an uncivil thing* / *to act one*
than, conjunction expressing comparison and correlated to the adjective *more*

61. Simple declarative sentence.

Subject, *thunder*
Modifiers of subject: { *the* / *live*
Predicate, *leaps*
Modifiers of predicate: { *from peak to peak* / *among the rattling crags*

62. Simple declarative sentence.

Subject, *birthday*
Modifiers of subject: { *Oliver Twist's* / *ninth*
Predicate, *found*
Object, *him.*
Modifier of object, *child*
Modifiers of child: { *a, pale, thin* / *diminutive* (*in stature*) (*somewhat*) / *small* (*in circumference*) (*decidedly*) / *connective, and*

63. *The Rhine and the Rhone* rise in Switzerland. The tables of stone *were cast to the ground and were broken.* The enemy insulted our *ambassador and our flag.*

64. How can we be happy, *thou being absent?*

65. He executed the prisoner, a humble *citizen.*

66. Washington, *the Father of his Country,* lives in the hearts of his countrymen.

67. Error, *wounded,* writhes with pain.

68. He arrived *much before the time.*

69. I saw Dr. Smith, the minister of the parish, last night.

70. Life is the *running of the race.*

71. *Skating* is a healthful exercise.

72. The *rising* waters impeded our progress.

73. *The teacher absenting himself,* there was no school.

74. Finding *myself* suddenly *deprived of the pleasures of the town,* I grew melancholy.

75. Dr. Livingstone *explored* a large part of Africa. A large part of Africa *was explored* by Dr. Livingstone.

76. His speech *against the repeal of the Union* produced a deep impression.

interjection article adjective noun verb adverb conj.
77. *Hurrah! the fearless soldiers have fought bravely and*
prep. pronoun
well *for their* country.

78. Wounds made by words are hard *to heal.*

79. The victim *to be sacrificed* is a lamb.

80. *To be* contents his natural desire.

81. His duty is to go.

82. He was about *to depart.*

83. *To fly* from mankind is not *to hate* them.

84. Bishop Jewel pronounced the clerical garb *to be* a *stage dress.*

85. Every object has several faces, so *to speak.*

86. *Facing* danger boldly is better than *shunning* it. *To face* danger boldly is better than *to shun* it.

87. *To ride* on horseback is one of the pleasures of youth. *Riding* on horseback is one of the pleasures of youth.

88. A *clause* is a part of a sentence which contains a subject and predicate. "Uneasy lies the head *that wears a crown.*"

89. Sentences
- According to Form
  - Simple
  - Complex
  - Compound
- According to Thought
  - Declarative
  - Exclamatory
  - Interrogative
  - Imperative

90. The principal clause contains the principal subject and predicate, and forms an assertion by itself. A dependent clause is one which has the value of an adjective, an adverb, or a noun, and *depends* on the principal clause. "I will see" (principal) "if they are here" (subordinate).

91. When they are of the same rank, either independent or dependent. I saw *that the bird was wounded,* and *that it could not fly.*

92. One that limits a noun or pronoun. "Men *that are selfish* never win our esteem." One that qualifies a verb, adjective, or an adverb. "The mists flee away *when the sun is risen.*" One which occupies the place of a noun. "*That he has been rash* is apparent to all."

93. One which is composed of one independent clause and one or more dependent clauses. "I see the golden helmet, *that shines far off like flame.*"

94. One made up of independent clauses. "*Every man desires to live long,* but *no man would be old.*"

95. *but, and, both, also, likewise, not only—but, now, not—but, either—or, whether—or, neither—nor, yet, still, only, therefore, wherefore, thus.*

96. Complex declarative sentence. Principal clause, *I hear the same story.*

Subject, *I*
Predicate, *hear*
Object, *story*
Modifier of predicate, *wherever I go* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *go*
Connective, *wherever*

97. Complex declarative sentence. Principal clause, *He took care to place himself.*

Subject, *he*
Predicate, *took*
Object, *care*
Modifier of object, *to place himself*
Modifier of *to place*, *where he could see all* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *could see*
Object, *all*
Modifier of object, *that went on* (*b*)
Connective, *where*
Analysis of (*b*): Subject and connective, *that*
Predicate, *went*
Modifier of predicate, *on*

98. Complex declarative sentence. Principal clause, *I will do it.*

Subject, *I*
Predicate, *will do*
Object, *it*
Modifier of predicate, *often*
as modifies *often*
Modifier of *as*, *as you wish* (*a*)
Analysis of (*a*): Subject, *you*
Predicate, *wish*
Connective, *as*

99. Complex declarative sentence. Principal clause, *She is older.*

Subject, *she*
Predicate, *is*
Complement, *older*
Modifier of complement, *than she looks*
Analysis: Subject, *she*
Predicate, *looks*
Connective, *than*

100. Complex declarative sentence. Principal clause, *The mail-train was late yesterday.*

Subject, *train*
Modifiers of subject: { *the*
mail
which usually is so punctual (*a*)

Predicate, *was*
Complement, *late*
Modifier of complement, *yesterday*
Analysis of (*a*): Subject and connective, *which*
Predicate, *is*
Complement, *punctual*
Modifiers of complement, { *usually* / *so*

101. Complex declarative sentence. Principal clause, *The captain told me so last night.*
Subject, *captain*
Modifiers of subject: { *the* (*a*) / *who is a man that I can trust*
Predicate, *told*
Object, *me*
Modifiers of predicate: { *so* / *last night*
Analysis of (*a*): Subject and connective, *who*
Predicate, *is*
Complement, *man*
Modifiers of comp. { *a* / *that I can trust* (*b*)
Analysis of (*b*): Subject, *I*
Pred., *can trust*
Object and Conn.: { *that*

102. Complex imperative sentence. Principal clause, *Tell me not, in mournful numbers.*
Subject, *you* (understood)
Predicate, *tell*
Indirect object, *me*
Direct object, *life is but an empty dream* (*a*)
Modifiers of predicate: { *not* / *in mournful numbers*
Analysis of (*a*): Subject, *life*
Predicate, *is*
Complement, *dream*
Modifiers of complement: { *an* / *empty*
Modifier of complement and its modifiers, *but*
Connective, *that* (understood)

103. Complex declarative sentence. Principal clause, *I have said.*
Subject, *I*
Predicate, *have said*
Object, *what I have said* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *have said*
Object and connective, *what*

104. Complex declarative sentence, with a dependent clause incorporated as subject.

Subject, *how far I have succeeded* (*a*)
Predicate, *is*
Complement, *for you to judge*
Analysis of (*a*): Subject, *I*
Predicate, *have succeeded*
Modifier of predicate, *how far*

105. Complex imperative sentence. Principal clause, *Let me know.*

Subject, *you* (understood)
Predicate, *let*
Object, *me*
Modifier of *me*, (*to*) *know*
Modifier of *know*, *when you can come* (*a*)
Analysis of (*a*): Subject, *you*
Predicate, *can come*
Modifier of pred. and connective: *when*

106. Complex, declarative sentence. Principal clause, *He supplies by self-confidence.*

Subject, *he*
Predicate, *supplies*
Modifier of predicate, *by self-confidence*
Object, *what he lacks in knowledge* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *lacks*
Modifier of predicate, *in knowledge*
Connective and Object, *what*

107. Complex declarative sentence, with the dependent clause used as the subject.

Subject, *what can't be cured* (*a*)
Predicate, *must be endured*
Analysis of (*a*): Subject, *what*
Predicate, *can be cured*
Modifier of predicate, *not*

108. Complex declarative sentence. Principal clause, *She loved me for the dangers.*

Subject, *she*
Predicate, *loved*
Object, *me*
Modifier of predicate, *for the dangers*
Modifier of dangers, (*which*) *I had passed* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *had passed*
Object and connective, *which*

109. Complex declarative sentence. Principal clause, *And the heart, distrusting, asks.*

Subject, *heart*

Modifiers of subject: { *the* / *distrusting*
Predicate, *asks*
Modifier of predicate: { *even while fashion's brightest arts decoy* (*a*)
Object, *if this be joy* (*b*)
Analysis of (*a*): Subject, *arts*
Modifiers of subject: { *fashion's* / *brightest*
Predicate, *decoy*
Modifiers of predicate, *even while*
Connective, *while*
Analysis of (*b*): Subject, *this*
Predicate, *be*
Complement, *joy*
Conjunction, *if*

110. Complex declarative sentence. Principal clause, *He ran so fast.*

Subject, *he*
Predicate, *ran*
Modifier of predicate, *fast*
Modifier of *fast, so*
Modifier of *so, that I could not overtake him* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *could overtake*
Object, *him*
Modifier of predicate, *not*
Connective, *that*

111. Complex declarative sentence. Principal clause, *He is as heavy.*

Subject, *he*
Predicate, *is*
Complement, *heavy*
Modifier of complement, *as*
Modifier of *as, as I am* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *am*
Connective, *as*
Complement, *heavy* (understood)

112. Complex declarative sentence. Principal clause, *Yet will I put my trust in him.*

Subject, *I*
Predicate, *will put*
Object, *trust*
Modifier of object, *my*
Modifiers of predicate: { *yet* / *in him* / *though he slay me* (*a*)

Analysis of (*a*): Subject, *he*
Predicate, *slay*
Object, *me*
Connective, *though*

113. Complex interrogative sentence. Principal clause, *Does such a scholar read books.*
Subject, *scholar*
Modifiers of subject: { *such* / *a*
Modifier of *such, as he is* (*a*)
Predicate, *does read*
Object, *books*
Analysis of (*a*): Subject, *he*
Predicate, *is*
Connective, *as*

114. Complex declarative sentence. Principal clause, *I will lend you the book.*
Subject, *I*
Predicate, *will lend*
Object, *book*
Modifier of object, *the*
Modifiers of predicate: { (*to*) *you* / *if I can find it* (*a*)
Analysis of (*a*): Subject, *I*
Predicate, *can find*
Object, *it*
Connective, *if*

115. Compound declarative sentence, composed of two complex clauses. Analysis of first complex.
Subject of principal clause, *he*
Predicate, *did*
Object, *much*
Modifier of object, *as*
Modifier of *as, as he could* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *could* (*do*)
Connective, *as*
Analysis of second complex sentence.
Subject of principal clause, *he*
Predicate, *did do*
Modifier of predicate, *not*
Object, *much*
Modifier of object, *as*
Modifier of *as, as he wished to do* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *wished*
Modifier of predicate, *to do*
Connective, *as*

116. Compound declarative sentence, composed of two complex clauses. First complex cause includes the first four lines. Principal clause, *Burning, yet tender, soft eyes did gaze on me once.*

Subject, *eyes*

Modifiers of subject: { *burning* / *yet tender* / *soft* }

Predicate, *did gaze*

Modifiers of predicate: { *once* / *on me* }

Modifier of *once, as I told in glee tales of the stormy sea* (*a*)

Analysis of (*a*): Subject, *I*
Predicate, *told*
Object, *tales*
Modifier of object, *of the stormy sea*
Modifier of predicate, *in glee*
Connective, *as*

Second complex clause. The principal clause is, *And their soft splendor fell on that dark heart of mine.*

Subject, *splendor*

Modifiers of subject: { *soft* / *their* }

Predicate, *fell*

Modifiers of predicate: { *on that dark heart of mine* / *as the white stars shine on the dark Norway pine* (*a*) }

Analysis of (*a*): Subject, *stars*
Modifiers of subject: { *the* / *white* }
Predicate, *shine*
Modifier of predicate: { *on the dar* / *Norway pine* }
Connective, *as*

The cöordinate conjunction *and* combines the two main clauses.

117. Complex declarative sentence. Principal clause, *He never lends a pencil.*

Subject, *he*
Predicate, *lends*
Object, *pencil*

Modifiers of predicate: { *never* / *although he has a dozen* (*a*) }

Modifier of object, *a*

Analysis of (*a*): Subject, *he*
Predicate, *has*
Object, *dozen*
Modifier of object, *a*
Connective, *although*

118. Complex imperative sentence. Principal clause, *Let him* (*to*) *cast the first stone.*

Subject, *you* (understood)
Predicate, *let*
Object, *him*
Infinitive phrase modifier of subject, (*to*) *cast the first stone*
Clause modifier of object, *that is without blame* (*a*)
Analysis of (*a*): Subject and connective, *that*
Predicate, *is*
Modifier of predicate, *without blame*

119. *That Julius Cæsar invaded Britain*, is a historic fact.

120. Plato taught *that the soul is immortal.*

121. Tweed's defiant question was, *What are you going to do about it?*

122. Our best friends are they *who tell us of our faults* and *who help us to mend them.*

123. Printing was unknown *when Homer wrote the Iliad.*

124. We started *when the sun rose.* We started *at sunrise.*

125. Thick mists are caused by the warm waters of the Gulf Stream, and these mists prevail in the neighborhood of Newfoundland. The thick mists which prevail in the neighborhood of Newfoundland are caused by the warm waters of the Gulf Stream.

126. All the world heard the guns *fired at Lexington.* All the world heard the guns *which were fired at Lexington.*

127. A fool is counted wise *when he holds his peace.* A fool *who holds his peace* is counted wise.

128. He asked me, "Why do you weep?" He asked me why I wept.

129. *Playing* is as necessary as working (noun). He *was playing* ball (verb). *Playing*-cards were introduced into Germany under Rudolph (adjective).

130. *That, what, when, if, how, why, who, where, whence,* etc.

131. *Wharves, axes, foci, cherubim* (*cherubs*), *phenomena.*

132. *Who* is applied to persons; *which*, to things or a collection; *that* is used when both persons and things are meant, when the clause is restrictive, especially after the superlative degree; after *who, same, very, no, all, each, any, every;* the personal pronouns; the predicate nominative referring to *it.*

133.

Singular.			Plural.		
Nom.	Poss.	Obj.	Nom.	Poss.	Obj.
ox	*ox's*	*ox*	*oxen*	*oxen's*	*oxen*
child	*child's*	*child*	*children*	*children's*	*children*
knife	*knife's*	*knife*	*knives*	*knives'*	*knives*
woman	*woman's*	*woman*	*women*	*women's*	*women*

134. *Radii, parentheses, brothers-in-law.*

135. *Mottoes', ladies', your or yours, men's.*

136. *Lass, emperor, czarina, Frances.*

137. *Elegies*, changing *y* into *ies*; *churches*, adding *es*; *pieces*, adding *s*.

138. *Person* is that modification of a noun or pronoun which denotes the speaker, the one spoken to, or the one spoken of. *Number* is that modification which denotes one thing or more than one. *Gender* is that modification which denotes sex. *Case* is the modification of a noun or pronoun which denotes its relation to the other words in the sentence.

139. *Personal pronouns* distinguish the grammatical persons. A *relative pronoun* is one that relates to some preceding word or words, and connects clauses. An *interrogative pronoun* is one used to ask a question. An *adjective pronoun* is one that performs the offices of both an adjective and a noun.

140. *Niece, heroine, baroness, benefactress, maid-servant.*

141. *Beau, colt, lad, monk, hart, wizard, stag, arbitrator.*

142. *Ladies:* "Common nouns ending in *y*, preceded by a consonant, form the plural by changing *y* into *ies*." *Valleys:* Nouns ending in *y*, preceded by a vowel, add *s* to form the plural. *Cargoes:* Many nouns ending in *o*, preceded by a consonant, add *es*.

143. *Pride, gold, copper, hay, mud, specie, dust, flesh, peace, mortar.*

144. *Bellows, tongs, shears, measles, victuals, politics, apocrypha, wages, nuptials, thanks.*

145. +'s, 2's, *t*'s.

146. *Deer, sheep, swine, series, corps, means, grouse, trout, gross, apparatus.*

147. In sacred writings and in poetry.

148. The name of many individuals taken together: *assembly, family, flock.* One that denotes a quality, action, or mode of being: *economy, murder, breadth.*

149. The substantive (noun, pronoun, phrase or clause) to which the pronoun refers. "I wished *to return*, *which* was impossible."

150. Personal.

151. *Whoever, whosoever, whoso.*

152. *That, which, what* (*which* and *that* sometimes borrow the possessive *whose*).

153. The man-of-war's rigging. The Prince of Wales' yacht. Hawkins and Jones' store.

154. An adjective is a word used to modify a noun or pronoun. An adverb is a word used to modify a verb, adjective, or other adverb.

155. Adjectives which may either accompany their nouns or represent them understood.

156. The soldiers went *home* on a furlough.

157. By adding *ly* or *s*.

158.

Positive.	Comparative.	Superlative.
bad	*worse*	*worst*
beautiful	*more beautiful*	*most beautiful*
heavy	*heavier*	*heaviest*
many	*more*	*most*

159. *Ill* or *bad*, *much* and *many*

160.

Positive.	Comparative.	Superlative.
wise	*wiser*	*wisest*
arrogant	*more* (or *less*) *arrogant*	*most* (or *least*) *arrogant*
fore	*former*	*foremost* or *first*

161. *An* is generally used before a word beginning with an *h* sound, if the accent is on the second syllable.

162. The same, being an earlier and later form of the same word.

163. *Square, dead, hollow, four-footed, equal, two, round, right.*

164. A verb is a word that asserts.

165. Verbs { According to { Transitive / Intransitive } / According to Formation of Principal Parts { Regular / Irregular }

166. A *transitive* verb has an object, or requires one to complete the sense: The lightning *struck* the oak. An *intransitive* verb does not require an object to complete the sense: Martha *sews*. A *regular* verb takes the ending *ed* to form its past: *plant, planted.* An *irregular* verb does not take *ed* to form the past: *cling, clung.*

167. Irregular intransitive, sometimes called neuter.

168. The *present tense*, the *past indicative*, the *perfect participle*, and sometimes the *present participle*.

169. One that helps in the conjugation of other verbs.

170. The *active* voice represents the subject as acting. The *passive* voice represents the subject as acted upon.

171. That modification of the verb which expresses the *manner* of the assertion.

172. The *indicative* asserts something as a fact. The *subjunctive* asserts something as a mere supposition, wish, or conclusion. The *potential* asserts the power, liberty, possibility, or necessity of acting or being. The *imperative* expresses command, entreaty, or permission. (The *infinitive* mode is sometimes given. It expresses the act or state in a general way without affirming it of anything.)

173. *Tense* is that modification of the verb which expresses time.

174. The *present* expresses action or being as present. The *past* expresses action or being as past. The *future* expresses action or being as future. The *present-perfect* expresses action or being as completed at the present time. The *past-perfect* expresses action or state as completed at some past time. The *future-perfect* expresses action as completed by a certain future time. Present, *I love;* present-perfect, *I have loved;* future, *I shall* or *will love;* past, I

loved; past perfect, *I had loved;* future-perfect, *I shall* or *will have loved.*

175. Present, *am, may, can, must, do;* past, *might, could, would, should, did;* future, *shall* or *will;* present-perfect, *have;* past-perfect, *had;* future-perfect, *shall* or *will have.*

176. Conjugation is the regular arrangement of all the forms of the verb to express voices, modes, tenses, persons, and numbers.

177. For conjugation of *be* see any grammar.

178. The regular arrangement of the forms of one number and person, in all the modes and tenses.

179. See any grammar.

180. Two, present and present-perfect: *to love, to have loved.*

181.

Present.	Past.	Past Participle.
read	*read*	*read*
bid	*bid* or *bade*	*bidden* or *bid*
drink	*drank*	*drank*
chide	*chid*	*chidden* or *chid*
choose	*chose*	*chosen*
skim	*skimmed*	*skimmed*
hang	*hung* or *hanged*	*hung* or *hanged*
lay	*laid*	*laid*
lie	*lay*	*lain*
swim	*swam* or *swum*	*swum*
take	*took*	*taken*
thrive	*throve*	*thriven*
tear	*tore*	*torn*
tread	*trod*	*trodden* or *trod*
work	*wrought*	*wrought*

182. Is brought.

183. He had gone; they had gone.

184. By placing *not* after it or after the first auxiliary.

185. By combining its perfect participle with *be* or some variation of *be.*

186. Subjunctive, *if, though, lest, unless, provided;* Potential, *may, can, must;* Imperative, *the second person,* and *do;* Infinitive, *to.*

187. *Do, make, let, feel, dare, see, hear, bid, must, need.*

188. Syntax treats of the relations of words in sentences.

189. The power that a word has to regulate the case of a noun or pronoun: "He came *after me.*" The concord of two connected words of the same number, gender, case, or person: "The man *who comes is he.*

190. Neither Mary nor her cousin *was* at our house.

191. The congregation arise, step quietly out of their pews, and disperse.

192. It is *I.*

193. Her beauty, intelligence, and amiability *were praised* by all.

194. *Only* he mourned for his brother, means no one else mourned. He *only* mourned for his brother, means he performed no other action in regard to his brother. He mourned *only* for his brother, means he mourned for no other person. He mourned for his *only* brother, means he had no other brother.

195. "A portrait of my father," means a picture representing my father's face. "A portrait of my father's," means any portrait in my father's possesssion.

196. Either you or I *am* in the wrong. When two or more nominatives are connected by *or* or *nor*, the verb takes the person of the nominative next to it.

If you were here you would find two or three in the parlor after dinner *who*, you would say, passed their afternoons very agreeably. *Who*, nominative case, subject of *passed*.

Hoping that I *shall* soon hear from you, believe me, Yours truly. *Shall* expresses simple futurity.

197. It is time we should *go*. Tenses must harmonize in a sentence.

198. Peter, John, and Andrew's occupation was that of fisherman. Common possession takes the sign but once—at the end.

199. He invited my brother and *me* to see his library. *Me* is the object of the verb *invited*.

200. She would not accept the jewels, though *they* were offered to her. The object (them) of the active verb becomes the subject (they) of the passive.

201. Bad men often honor virtue at the bottom of their hearts. The pronoun *they* is redundant.

202. They were troubled *by* the mosquitoes. *By* refers to the agent; *with* implies accompaniment or manner.

203. The book was read by the old and *the* young. *The* is needed to convey the idea that there are two classes, *old* and *young*.

204. I received a letter from my cousin *who* was here last week. *She* is unnecessary.

205. Where are the Martins? I believe that is *they* coming behind us. Neuter verbs take the same case after them as before.

206. *That* kind of injuries we need not fear. *That* must agree in number with *kind*.

207. The Scriptures are more valuable than any *other* writings. Comparative degree calls for *two* objects of comparison.

208. She bought a pair of new gloves. Adjectives precede the nouns they modify.

209. Every one must judge of *his* own feelings. Singular antecedent *one* must be followed by singular pronoun.

210. This is the student to *whom* I gave the book. Preposition *to* governs the objective.

211. We knew it to be *him*. *Him* agrees in case (predicate objective) with *it*.

212. It could not have been *she*. *She* agrees in case with *it* (predicate nominative).

213. Who is there? It's I. Who's I? The pronouns in the predicate agree in case with the subjects to which they refer.

214. Now remember this is between you and *me*. Object of preposition *between* is in the objective.

215. I do not doubt *that* it is true. *But* is superfluous. The noun clause *that it is true* is the direct object of *doubt*.

216. The clergyman read the *first two* stanzas of the hymn. There is but one *first*, but there may be many groups of two stanzas.

217. The velvet feels *smooth*. An adjective is needed when some *quality* of the subject is implied.

218. I recollect you *were* his advocate in that important trial. The verb *were* must agree in person and number with its subject, *you*.

219. I feel *bad*. *Bad* is an adjective belonging to *I*.

220. In the camp of Israel every man and every woman *was* numbered. "Two or more singular subjects taken *individually*, even if connected by *and*, require the verb to be singular."

221. There *is* a class of men who never take forethought. *Class* is a singular collective noun, the individuals not being regarded.

222. I had *written* to him the day before. The past-perfect tense is formed by *had* and the participle *written*.

223. The books were *laid* upon the table. The intransitive verb *lie* cannot be used in the passive voice.

224. She *dares* not oppose it. *Dares* must be singular to agree with *she*.

225. Circumstances *alter* cases. A verb must agree in number with its subject.

226. He *needs* not to trouble himself. *Needs* must agree with *he*.

227. What *has* become of your cousins? *Has* must agree with *what*.

228. By *lying* abed in the morning, one loses a tenth part of one's time. The intransitive verb *lie* needed here.

229. *Lie* down and rest. Same reason.

230. There *go* Mr. and Mrs. Smith. "Two subjects connected by *and* and relating to different persons take a plural verb."

231. How *are* your father and mother? Same reason.

232. Noun, proper, 2nd person, plural, nominative case, independent. *Silent*, adjective, descriptive, common, not compared, modifies *Romans, countrymen, lovers*. *Believe*, verb (*believe, believed, believed*), regular, transitive, active. Imperative mode, 2nd person, plural, agrees, with subject *ye* understood. *Mine*, pronoun, per-

sonal, 1st person, singular, possessive case (nom. *I*, poss. *my* or *mine*, obj. *me*), and limits *honor*. *Better*, adverb of manner (positive *well*, comparative *better*, superlative *best*), comparative degree, and modifies *judge*. *The* is sometimes elegantly required before a comparative or superlative adverb to express emphasis. *Judge*, verb (*judge, judged, judged*) regular, intransitive, potential mode, present tense, 2nd person, plural, and agrees with *you*.

233. *Library*, common noun, collective, neuter gender, 3rd person, singular, nominative case, subject of *has been*. *Means*, common noun, 3rd person, same form in both numbers, neuter gender, nominative predicate, in same case with *library*. *Furnishing*, common noun, participial, 3rd person, singular, neuter gender, objective case, object of the preposition *of*. *Public*, common noun, collective, 3rd person, singular, common gender, objective case, object of *furnishing*. *Bearing* is a participle from the irregular verb *bear, bore, borne*, intransitive, present, relates to *information*. *Customs*, common noun, 3rd person, plural, neuter gender, objective case, object of preposition *upon*. *Unknown*, adjective, descriptive, common, not compared, limits countries.

234. *Mile*, common noun, 3rd person, singular, neuter gender, objective case. *Price, value, measure* are in the objective without a preposition. *Knave*, common noun, 3rd person, singular, masculine gender, objective case, in opposition with *him*. *Him*, pronoun, personal, 3rd person, singular, masculine, declined nom. *he*, poss. *his*, obj. *him*, objective case, object of the verb *struck*. *Blow*, common noun, 3rd person, singular, neuter, objective case, object of *struck*. A few verbs have two different objects at once, provided they can govern them as well separately.

235. *There*, adverb, used by an idiom to introduce a verb before its subject, and called an *expletive*, or *filling-out* word. *There*, adverb of place, belongs to *were*.

236. *Still*, adverb of degree, implying something beyond what might be expected, limits *had*. *For*, subordinating conjunction of reason and cause, unites the dependent and independent clauses. *Still*, adverb of time absolute, limits *attends*. *Amidst*, preposition, shows the relation between *to show* and *swains*.

237. *Till* is a conjunctive adverb of time, modifying the verbs *pause* and *come*, and connecting the dependent clause with the independent clause adverbially. *Come*, verb, *come, came, come*, irregular, intransitive, subjunctive, present, 3rd person, singular, agrees with *it;* sign of the subjunctive *till*. *Back*, adverb of place, showing motion toward, limits *come*.

238. *As far as*, adverbial phrase with the construction of a conjunction, belongs to *will run* and *has*, and connects the two clauses.

239. *Open*, adjective, common, descriptive, not compared, modifies door.

240. *Ashore*, adverb of place, limits *went*. *Just*, adverb of extent, belongs to the phrase *below Barnegat*.

ANSWERS TO GRAMMAR. SECOND GRADE.

1. Place, time, manner and degree, cause, result or effect, condition, concession, end or purpose.

2. Where, whence, when, as, while, until, ere, before, since, after, as soon as, as long as, because, whereas, for that, if, unless, without, except, provided, though, although, so that, notwithstanding that, in order that, lest, than.

3. As subject of a verb, as object of a verb, as predicate noun, in apposition, as object of a preposition.

4. Complex declarative sentence. Principal clause, *Nero was fiddling.*

Subject, *Nero*
Predicate, *was fiddling*
Modifier of predicate, { *when Rome was burning* (*a*)
Analysis of (*a*): Subject, *Rome*
Predicate, *was burning*
Modifier of predicate, and Connective { *when*

5. Complex exclamatory sentence. Principal clause, *here comes my brother.*

Subject, *brother*
Modifier of subject, *my*
Predicate, *comes*
Modifiers of predicate: { *here* / *as I am a living man* (*a*)

Analysis of (*a*), which is an exclamatory clause in the dependent form:

Subject, *I*
Predicate, *am*
Complement, *man*
Modifiers of complement: { *a* / *living*
Connective, *as*

6. Simple declarative sentence, with a participial phrase.

Subject, *we*
Predicate, *began*
Object, *ascent*
Modifier of predicate: { *having first procured our guides*
Modifiers of object: { *the* / *of the mountain*

7. Simple declarative sentence, with an infinitive phrase.

Subject, *it*
Predicate *is*

Complement, *sweet*

Infinitive phrase explanatory of *it*, { *to hear the watchdog's* / *honest bark*

8. Simple declarative sentence.
Subject, *ruler*
Modifiers of subject: { *a* / *wise*
Predicate, *does subject*
Object, *subject*
Modifiers of predicate: { *not* / *to unnecessary taxation*
Modifiers of object: { *a* / *good*

9. Simple interrogative sentence.
Subject, *Henry*
Predicate, *did do*
Object, *what*

10. Complex declarative sentence. Principal clause, *the fact is not sufficiently recognized.*
Subject, *fact*
Modifiers of subject: { *the* / *that man's powers are limited* (*a*)
Predicate, *is recognized*
Modifiers of predicate: { *not* / *sufficiently*
Analysis of the adjective clause (*a*)
Subject, *powers*
Modifier of subject, *man's*
Predicate, *are limited*
Connective, *that*

11. Complex declarative sentence. Principal clause, *he was generally master of that* (*what* is equivalent to *that which*).
Subject, *he*
Predicate, *was*
Complement, *master*
Modifier of predicate, *generally*
Modifier of complement, { *of what* (*that which*) *he under-* / *took* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *undertook*
Object, *what* (*that which*)
Connective, *what* (*which*)

12. Simple declarative sentence with a compound predicate.
Subject, *ship*
Modifier of subject, *the*
Predicates: { *was loaded and* / *sailed*
Modifier of second predicate, *from port*

13. Complex declarative sentence. Principal clause, *the ship sailed from port.*

Subject, *ship*
Modifier of subject, *the*
Predicate, *sailed*
Modifiers of predicate: { *from port* / *when it had been loaded* (*a*)
Analysis of adverb clause (*a*): Subject, *it*
Predicate, *had been loaded*
Connective, *when*

14. Complex declarative sentence. Principal clause, *The ship sailed from port.*

Subject, *ship*
Modifiers of subject: { *the* / *which had been loaded* (*a*)
Predicate, *sailed*
Modifier of predicate, *from port*
Analysis of adjective clause (*a*):
Subject and connective, *which*
Predicate, *had been loaded*

15. Simple exclamatory sentence.

Subject, *scenes*
Modifiers of subject: { *the* / *of my childhood*
Predicate, *are*
Complement, *dear*
Modifiers of complement: { *how* / *to my heart*

16. Simple interrogative sentence.

Subject, *it*
Predicate, *is*
Complement, *worth*
Modifier of comp., { *while* (the objective case sometimes modifies like an adverb)
Phrase in apposition with subject, *for us to go*

17. Simple declarative sentence.

Subject, *ship*
Modifiers of subject: { *Hudson's* / *the Half Moon*
Predicate, *was sent*
Modifiers of predicate: { *also* / *to the Hudson River* / *on a like errand* / *by the company*

18. Simple interrogative sentence.

Subject, *trees*
Modifier of subject, *many*
Modifier of *many*, *how*

Predicate, *are*

Modifiers of pred.: { *in that lot* / (*there* is the expletive and not an adverb of place)

19. Compound imperative sentence, consisting of two simple sentences. Analysis of the first, *keep still:*

Subject, *you* (understood)
Predicate, *keep*
Complement, *still*

Analysis of second proposition, *or go out:*

Subject, *you* (understood)
Predicate, *go*
Modifier of predicate, *out*

The two clauses are introduced and connected by the coördinating, alternative conjunctions *either, or*

20. Complex declarative sentence, with the noun clause *that fortune favors the brave* used as subject.

Subject, *that fortune favors the brave* (*a*)
Predicate, *is proved*
Complement, *true*
Modifier of complement, *often*
Analysis of (*a*): Subject, *fortune*
Predicate, *favors*
Object, *brave*
Modifier of predicate, *often*
Modifier of object, *the*
Connective introducing noun clause, *that*

21. Complex declarative sentence. Principal clause, *he whistled.*

Subject, *he*
Predicate, *whistled*
Modifier of predicate, *as he went* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *went*
Modifier of pred., { *as* (conjunctive and connective, / adverb)

22. Simple declarative sentence, with an independent participial phrase, *in speaking of Smith's farm.*

Subject, *mine* (my farm)
Predicate, *is*
Complement, *larger*
Modifier of complement, (by) *twenty acres*

23. Simple declarative sentence.

Subject, *people*
Modifier of subject, *the*
Predicate, *elected*
Object, *Garfield*
Appositive modifier of object, or objective predicate } *president*

24. Simple declarative sentence.
Subject, *he*
Predicate, *painted*
Object, *house*
Modifier of object, *the*
Objective or factitive predicate, *yellow*

25. Complex declarative sentence. Principal clause, *I can say no more at present.*
Subject, *I*
Predicate, *can say*
Object, *more*
Modifiers of predicate: { *at present* / *as I am pressed for time* (*a*)
Modifier of object, *no*
Analysis of (*a*): Subject, *I*
Predicate, *am pressed*
Modifier of predicate, *for time*
Connective, *as*

26. Simple imperative sentence.
Subject, *you* (understood)
Predicate, *ask*
Object, *carpenter*
Modifiers of object: { *to plane the board true* / *the*

27. Complex imperative sentence. Principal clause, *mark now.*
Subject, *you* (understood)
Predicate, *mark*
Modifiers of predicate: { *now* / *how a plain tale shall put you down* (*a*)
Analysis of (*a*): Subject, *tale*
Modifiers of subject: { *a* / *plain*
Predicate, *shall put*
Object, *you*
Modifier of predicate, *down*
Connective, *how*

28. Simple declarative sentence.
Subject, *soldiers*
Predicate, *called*
Object, *stars and stripes*
Modifiers of subject: { *the* / *in the late war*
Objective or factitive predicate, *Old Glory*

29. Complex declarative sentence. Principal clause, *he may live to fight another day.* The dependent clause, *that fights and runs away,* has a compound predicate.

Subject, *he*
Modifier of subject, *that fights and runs away* (*a*)
Predicate, *may live*
Modifier of predicate, *to fight another day*
Analysis of the adjective clause (*a*):
Subject and connective, *that*
Compound predicate, *fights and runs*
Modifier of predicate *runs, away*

30. Simple declarative sentence.
Subject, *he*
Predicate, *worked*
Object, *hand*
Modifier of object, *his*
Objective or factitive predicate, *sore*

31. Complex declarative sentence. Principal clause, *Sir Isaac Newton drew close to the grate.*
Subject, *Sir Isaac Newton*
Predicate, *drew*
Modifiers of predicate: { *close* / *to the grate*
Modifier of *grate, in which a fire had just been kindled* (*a*)
Analysis of (*a*), subordinate, adjective clause:
Subject, *fire*
Modifier of subject, *a*
Predicate, *had been kindled*
Modifiers of predicate: { *in which* / *just*
Connective, *which*

32. Complex declarative sentence. Principal clause, *The success was as great*
Subject, *success*
Modifier of subject, *the*
Predicate, *was*
Complement, *great*
Modifier of complement, *as*
Adv. clause, modifier of *as, as he expected* (*a*)
Analysis of (*a*): Subject, *he*
Predicate, *expected*
Connective, *as*

33. Complex declarative sentence. Principal clause, *he was so successful.*
Subject, *he*
Predicate, *was*
Complement, *successful*
Modifier of complement, *so*
Modifier of *so, that he was able to retire from business* (*a*)
Analysis of (*a*), an adverb clause:
Subject, *he*
Predicate, *was*

Complement, *able*
Modifier of complement, *to retire from business*
Connective, *that*

34. Complex imperative sentence. Principal clause, *withdraw thy feet from thy neighbor's house.*
Subject, *thou* (understood)
Predicate, *withdraw*
Object, *feet*
Modifier of object, *thy*
Modifiers of pred.: { *from thy neighbor's house* / *lest he be weary of thee and so hate thee* (*a*) }
Analysis of (*a*), adverb clause, with a compound pred.:
Subject, *he*
Predicates, { *be and* / *hate* }
Complement, *weary*
Modifier of predicate, *so*
Object, *thee*
Modifier of complement, *of thee*
Connective, *lest*

35. Compound declarative sentence, composed of two simple sentences.
Analysis of first sentence:
Subject, *harvest*
Modifier of subject, *the*
Predicate, *is*
Complement, *abundant*
Analysis of second sentence:
Subject, *we*
Predicates: { *will rejoice* (*and*) / *be* }
Complement, *glad*
Coördinating conjunction, *therefore*

36. Complex declarative sentence. Principal clause, *the daughter is as old.*
Subject, *daughter*
Modifier of subject, *the*
Predicate, *is*
Complement, *old*
Modifier of complement, *as*
Modifier of *as*, *as the mother was twenty years ago*
Analysis of (*a*), an abverb clause:
Subject, *mother*
Modifier of subject, *the*
Predicate, *was*
Modifier of predicate, *twenty years ago*
Connective, *as*

37. Complex declarative sentence. Principal clause, *such neighbors are neighbors indeed.*

Subject, *neighbors*
Modifier of subject, *such*
Modifier of *such*, { *as these neighbors have shown themselves to be* (*a*)
Predicate, *are*
Complement, *neighbors*
Modifier of predicate, *indeed*

Analysis of the adjective clause (*a*):

Subject, *neighbors*
Modifier of subject, *these*
Predicate, *have shown*
Object, *themselves*
Modifier of object, *to be*
Connective, *as*

38. Compound declarative sentence, composed of two simple clauses. First clause:

Subject, *North River*
Modifier of subject, *the*
Predicate, *was called*
Modifier of predicate, *in honor of its discoverer*
Complement, *Hudson*
Modifier of complement, *the*
Modifier of *honor*, *of its discoverer*

Analysis of second clause:

Subject, *South River*
Modifier of subject, *the*
Predicate, *was called*
Modifier of predicate, *in honor*, etc.
Modifier of *honor*, *of Lord de la War*
Modifier of *Lord de la War*, *one*
Modifier of *one*, *of the original proprietors*
Modifier of *proprietors*, *of that region*
Complement, *Delaware*
Connective, *and*

39. Complex declarative sentence. Principal clause, *A fort once stood.*

Subject, *fort*
Modifier of subject, *a*
Predicate, *stood*
Modifiers of predicate: { *once* / *where we are now standing* (*a*)

Analysis of (*a*): Subject, *we*
Predicate, *are standing*
Modifiers of predicate: { *now* / *where*
Connective, *where*

40. Simple declarative sentence.

Subject, *I*
Predicate, *should call*
Object, *her*
Objective or factitive predicate, *simpleton*, modifier *a*

41. Simple imperative sentence.
Subject, *you* (understood)
Predicate, *plant*
Object, *seeds*
Modifier of predicate, *deep*
Modifier of object, *the*
Modifier of *deep*, *in the ground*

42. Simple declarative sentence.
Subject, *he*
Predicate, *was elected*
Complement, *chairman*
Modifier of complement, *of the meeting*

43. Simple declarative sentence.
Subject, *captain*
Modifiers of subject { *the* / *of the ship*
Predicate, *anchored*
Object, *her*
Modifier of predicate, *below the pier*
Modifier of *below the pier*, *just*

44. Complex declarative sentence. Principal clause, *The red-man wondered.*
Subject, *red-man*
Predicate, *wondered*
Modifier of predicate, { *what awful voice was speaking amid the wind* (*a*) *that roared through the tree-tops*

Analysis of (*a*):
Subject, *voice*
Modifiers of subject: { *what* / *awful*
Predicate, *was speaking*
Modifier of predicate, *amid the wind*
Modifier of *wind*, *that roared through the tree-tops* (*b*)
Connective, *what*

Analysis of (*b*):
Subject, *that*
Predicate, *roared*
Modifier of predicate, *through the tree-tops*
Connective, *that*

45. Complex declarative sentence. Principal clause, *Napoleon ordered.*
Subject, *Napoleon*
Predicate, *ordered*
Object, *that a part of the soldiers should act as prisoners* (*a*)

Analysis of noun clause (*a*):
Subject, *part*
Modifiers of subject: { *a* / *of the soldiers*
Predicate, *should act*
Modifier of predicate, *as*
Complement, { *prisoners* (or *prisoners* may be the subject of *act* understood in a new clause introduced by *as*)
Connective, *that*

46. Simple declarative sentence.
Subject, *fishes*
Predicate, *can live*
Modifier of predicate, *in water*
Modifier of *in water*, *only*

47. Simple declarative sentence, with two infinitive phrases.
Subject, *he*
Predicate, *constrained*
Object, *disciples*
Modifier of predicate, *straightway*
Modifier of *disciples*, { *to enter into a boat and to go before him unto the other side*
Modifier of object, *the*

48. Complex declarative sentence. Principal clause, *thou shalt be wise for thyself.*
Subject, *thou*
Predicate, *shalt be*
Complement, *wise*
Modifier of complement, *for thyself*
Modifier of predicate, *if thou be wise* (*a*)
Analysis of (*a*): Subject, *thou*
Predicate, *be*
Complement, *wise*
Connective, *if*

49. Simple declarative sentence, with a compound predicate The three predicates *had laid, bound, put.*
Subject, *Herod*
Predicates connected by *and*: { *had laid* / *bound* / *put*
Objects: { *hold* / *him* / *him*
Modifier of first object, *on John*
Modifiers of last predicate: { *in prison* / *for the sake*
Modifier of *sake*: { *of Herodias, his brother* / *Philip's wife*

50. Complex declarative sentence. Principle clause, *He will come.*
Subject, *he*
Predicate, *will come*
Modifier of predicate, *provided he receive my letter* (*a*)
Analysis of adverb clause (*a*): Subject, *he*
Predicate, *receive*
Object, *letter*
Modifier of object, *my*
Connective, *provided*

51. Complex declarative sentence. Principal clause, *The true monarchs of every country are those.*
Subject, *monarchs*
Modifiers of subject: { *the* / *true* / *of every country*
Predicate, *are*
Complement, *those*
Modifier of complement, { *whose sway is over thought and emotion* (*a*)
Analysis of adjective clause (*a*): Subject, *sway*
Predicate, *is*
Modifier of subject and connective, *whose*
Modifiers of predicate: { *over thought and* / *emotion*

52. Complex declarative sentence. Principal clause, *he called for me.*
Subject, *he*
Predicate, *called*
Modifiers of predicate: { *for me* / *for I was to go with him* (*a*)
Analysis of adverb clause (*a*): Subject, *I*
Predicate, *was*
Modifier of pred., *to go with him*
Connective, *for*

53. Complex declarative sentence. Principal clause, *I said*
Subject, *I*
Predicate, said
Object, *that I laid down the money to pay the bill* (*a*)
Analysis of noun clause (*a*): Subject, I
Predicate, *laid*
Object, *money*
Modifier of pred., *down*
Modifiers of object: { *the* / *to pay the bill*
Connective, *that*

54. Complex interrogative sentence. Principal clause, *Will he stay?*
Subject, *he*
Predicate, *will stay*

Modifiers of predicate: { *until I come back* (*a*) / *if I do go* (*b*)
Analysis of adverb clause (*a*): Subject, *I*
Predicate, *come*
Modifier of pred., *back*
Connective, *until*
Analysis of adverb clause (*b*), modifier of *come:* Subject, *I*
Predicate, *do go*
Connective, *if*

55. Simple declarative sentence.
Subject, *triumphs*
Modifiers of subject: { *all* / *the* / *of truth and* (*of*) *genius,* / *over prejudice and* / *power,* / *in every country, and* / *in every age*
Predicate, *have been*
Complement, *triumphs*
Modifiers of complement: { *the* / *of Athens*

56. Simple declarative sentence, with an infinitive phrase used as subject.
Subject, the noun-phrase *to appear discouraged*
Predicate, *is*
Complement, *way*
Modifiers of complement: { *the* / *to become so*

57. Simple imperative sentence.
Subject, *you* (understood)
Predicate, *wait*
Modifier of predicate, *a moment*
Modifier of *a moment, just*

58. Simple declarative sentence, with a participial phrase.
Subject, *he*
Predicate, *was*
Complement, *active*
Modifiers of complement: { *wonderfully* / *considering his age*

59. Complex declarative sentence. Principal clause, *It is just about a year,* with two dependent clauses.
Subject, *it*
Predicate, *is*
Complement, *year*
Modifiers of complement: { *a* / *about*
Modifier of *about, just*
Modifier of predicate, *since I saw* (*a*)

Analysis of adverb clause (*a*): Subject, *I*
Predicate, *saw*
Connective, *since*
Object, *what was doing there* (*b*)
Analysis of noun clause (*b*): Subject and connective, *what*
Predicate, *was doing*
Modifier of predicate, *there*

60. Complex imperative sentence. Principal clause, *ye shall not eat of it.*

Subject, *ye*
Predicate, *shall eat*
Modifiers of predicate: { *not* / *of it* / *lest ye die* (*a*)
Analysis of adverb clause (*a*): Subject, *ye*
Predicate, *die*
Connective, *lest*

61. Complex imperative sentence. Principal clause, *the Lord's sweet pity with her go.*

Subject, (you) understood
Predicate, (let)
Object, *pity*
Modifiers of object: { *the* / *Lord's* / *sweet* / (*to*) *go*
Modifiers of *go*: { *with her* / *where'er her troubled path may be* (*a*)
Analysis of adverb clause (*a*): Subject, *path*
Modifiers of subject: { *her* / *troubled*
Predicate, *may be*
Modifier of pred., and connective, { *where'er*

62. Complex declarative sentence. Principal clause, *I do not care.*

Subject, *I*
Predicate, *do care*
Modifiers of predicate: { *not* / *whether he comes or not* (*a*)
Analysis of adverb clause (*a*): (Written in full it would read, *whether he comes or does not come.*)
Subject, *he*
Predicates: { *comes* / *does come*
Modifier of predicate, *not*
Connectives: { *whether* / *or*

63. Complex imperative sentence. Principal clause, *Let him hear.*

Subject, *thou* (understood)
Predicate, *let*
Object, *him*
Modifier of *him*, (to) *hear*
Modifier of object, *that hath ears to hear* (*a*)
Analysis of adjective clause (*a*): Subject; *that*
Predicate, *hath*
Object, *ears*
Modifier of object, *to hear*
Nominative independent by pleonasm, *he*

64. Simple declarative sentence, with a participial phrase.

Subject, *something*
Predicate, *is*
Complement, the infinitive phrase *to be said in his favor*
Modifiers of predicate: { *yet* / *allowing all this*
Introductory adverb (expletive), *there*

65. Complex declarative sentence. Principal clause, *There shall not be left one stone upon another.*

Subject, *stone*
Modifiers of subject: { *one* / *that shall not be thrown down*
Predicate, *shall be left*
Modifiers of predicate: { *not* / *upon another*
Expletive, *there*
Analysis of adjective clause (*a*): Subject, *that*
Predicate, *shall be thrown*
Modifiers of pred.: { *not* / *down*
Connective, *that*

66. Complex declarative sentence. Principal clause, *Ye cannot be saved.*

Subject, *ye*
Predicate, *can be saved*
Modifiers of predicate: { *not* / *except these abide in the ship* (*a*)
Analysis of adverb clause (*a*): Subject, *these*
Predicate, *abide*
Modifier of pred., *in the ship*
Connective, *except*

67. Complex declarative sentence. Principal clause, *I know a bank.*

Subject, *I*
Predicate, *know*
Object, *bank*

Modifiers of object: { *a* / *whereon the wild thyme grows* (*a*)

Analysis of adjective clause (*a*): Subject, *thyme*

Modifiers of subject: { *the* / *wild*

Predicate, *grows*

Modifier of pred., and connective, { *whereon*

68. Complex imperative sentence. Principal clause, *Defer not till evening.* *What* may be considered equivalent to *that which*, and the principal clause will be *Defer not that till evening*, and the dependent clause *which morning may and should accomplish.* For the sake of variety this construction will be given. See 59.

Subject, *you* (understood)

Predicate, *defer*

Modifiers of predicate: { *not* / *till evening*

Object, *that*

Modifier of object, { *which morning may and should accomplish* (*a*)

Analysis of the noun clause in apposition (*a*):

Subject, *morning*

Predicates: { *may* (accomplish) *and* / *should accomplish*

Object and connective, *which*

69. Simple declarative sentence, with an infinitive phrase.

Subject, *man*

Modifiers of subject: { *the* / *young*

Predicate, *received*

Object, *dollars*

Modifier of object, *ten thousand*

Modifier of *dollars*, *to begin the world with* (which)

70. Complex declarative sentence. Principal clause, *The mill will never grind with the water.*

Subject, *mill*

Modifier of subject, *the*

Predicate, *will grind*

Modifiers of predicate: { *never* / *with the water*

Modifier of *water*, *that is past* (*a*)

Analysis of adjective clause (*a*): Subject and connective { *that*

Predicate, *is*

Complement, *past*

71. Simple declarative sentence.

Subject, *he*

Predicate, *extolled*

Object, *wares*

Modifier of object, *his*
Modifier of predicate, *beyond their worth*

72. Simple declarative sentence, with an infinitive phrase.
Subject, *John*
Predicate, *is*
Complement, *foolish*
Modifier of complement, *very*
Modifier of *foolish*, *to take such a thing to heart*

73. Simple exclamatory sentence, with an infinitive phrase.
Subject, *it*
Predicate, *is*
Complement, *sweet*
Modifier of complement, *how*
Noun phrase in apposition with subject, { *to lie down on the pillow after a day spent in temperance*

74. Compound declarative sentence, composed of a complex and a compound sentence. Analysis of the complex sentence: Principal clause, *I know not that course* (*what* equivalent to *that which*);
Subject, *I*
Predicate, *know*
Modifier of predicate, *not*
Object, *course*
Modifiers of object: { *that which others may take* (*a*)
Analysis of adjective clause (*a*): Subject, *others*
Predicate, *may take*
Object and connective { *which*
Analysis of the compound member: First proposition, *but as for me, give me liberty;*
Subject, *you* (understood)
Predicate, *give*
Object, *liberty*
Modifier of predicate, (to) *me*
Exclamatory phrase abridged from a dependent clause, { *as for me*
Connective, *but*
Analysis of second proposition, *or give me death:*
Subject, *you* (understood)
Predicate, *give*
Object, *death*
Modifier of predicate, (to) *me*
Connective, *or*

75. Though he search all day, he will not find it.

76. His letter is to the purport *that he will soon arrive.*

77. He retired *because he could not help it.*

78. She stoops *that she may conquer.* She stoops *to conquer.*

79. We are pained *to hear God's name profaned.* We are pained *when we hear God's name profaned.*

80. *For me to go* is impossible. I love *to rest under the tree. That the earth is round* is now well known. He now learned *what it is to be poor.*

81. The books *which* lie on the table are school-books.

82. *Brothers,* members of one family; *brethren,* members of a society. *Dies,* stamps for coining; *dice,* small cubes for gaming. *Indexes,* tables of contents; *indices,* algebraic signs.

83. Moneys', pennies', talismans'.

84. Connecting sentences in the manner of a conjunction, and representing a noun by referring to an antecedent.

85. It precedes the verb.

86. Sisters-in-law's, mouse-traps', hangers-on's.

87. *Youth, countess, nephew, madam, mamma, heiress, empress, marchioness, testatrix, duchess, Josephine, Caroline, widower, swain.*

88. *Sirs, Messrs.* (Messieurs), *mesdames, banditti* or *bandits, radii, analyses, strata, genera.*

89. Four, four hundred firsts.

90. By its offices, and its inflection, which is by degree or comparison.

91. *This, that.*

92. As an *adjective,* it limits; as a *conjunction,* it connects; as a *relative pronoun,* it represents its antecedent; as a *demonstrative pronoun,* it performs the offices of a noun and an adjective.

93. *Cardinals* are limiting adjectives which express number by denoting a total, as *eight. Numerals* are limiting adjectives which express number. *Ordinals* state the place of the individual in the series: *eighth.*

94. *Place and motion; time and succession; manner and quality; measure and degree; modality.*

95. *Beautiful, more beautiful, most beautiful; fore, former, foremost or first.*

96. One that has assumed an auxiliary.

97. *Mode,* from its derivation from the Latin *modus* (manner), and its signification "the manner of the action."

98. By the person and number of the subject.

99. Old or strong: *bind, bound, bound.* New or weak: *love, loved, loved.*

100. (Answer left for the student.)

101. Future-perfect.

102. It does not.

103. *Mulct, mulcted, mulcted; shear, sheared* or *shore, sheared* or *shorn; beat, beat, beaten* or *beat; seethe, seethed* or *sod, seethed* or *sodden.*

104. One that wants most of its parts, or has no participle: *beware, methinks, ought.* One that has more than one form in any of its parts: *worked* or *wrought.*

105. One that connects a subject and some word or words describing that subject, and has no meaning of its own except that of signifying the assertion.

106. One used with the subject *it*, when no definite actor is referred to.

107. One that expresses affirmation, or that has person and number.

108. (Answer left for the student.)

109. *Shall* in the first persons, and *will* in the others, denote simple futurity; *will* in the first persons, and *shall* in the others, express determination or compulsion.

110. Those made from other prepositional or from adverbial elements (by combination), or from verbs, as *aslant, notwithstanding, into.*

111. *From out, in front of, for the sake of, in respect to, as for.*

112. *Touching, save, respecting, past, except.*

113. *Coördinating* are those that unite sentences of equal rank or order: *and, or, but, for. Subordinating* are those which connect a dependent clause to that on which it depends, and are further divided into conjunctions of *place* and *time: where, when, while, until, ere, since, as soon as,* etc.;—of cause and condition: *because, whereas, if, unless, provided, though;*—of end or purpose: *that, so that, in order that, lest;*—of comparison: *as, than.*

114. Conjunctive adverbs perform two offices, uniting and modifying. Pure conjunctions merely unite.

115. The same flag *that* we saw before (relative). The court of England has survived *that* of France (adjective pronoun). *That* book belongs to me (adjective). Few people know *that* some crows are a hundred years old (conjunction).

116. Sin may gratify, *but* repentance stings (conjunction). Words are *but* leaves (adjective). I did *but* borrow the horse; Friends are *but* few (adverb). Whence all *but* him had fled (preposition).

117. The violin or the banjo, played by some old negro, *beguiles* the summer evening.

118. Whose gray top shall tremble, *He* descending.

119. Each of our party has carried a knapsack with *him.*

120. You have been playing *these* two hours.

121. Solomon was the wisest of the ancient kings.

122. This is a more reasonable proposition than any of the others.

123. One or more words *are* omitted. Neither thou nor I *am* to blame.

124. I met him at Smith the *bookseller's.* These works are Cicero's, the most eloquent of men.

125. My two friends have married, respectively, a sensible, and a beautiful woman. My friend married a sensible and beautiful woman.

126. *He* being on deck, etc. A noun or pronoun used *absolutely* must be in the nominative case.

127. Shall you go to the *President's* this evening? *Shall* is here the appropriate word to denote mere futurity.

128. This is a discovery of Sir Isaac Newton's. (One of Sir Isaac Newton's discoveries.)

129. This is the house of my father's brother's daughter. A harsh possessive may often be avoided by using *of* and the objective.

130. Thee, *whom* he had most injured, etc. *Whom* is the object of *had injured.*

131. You will never have another such chance. No article is needed when the noun is sufficiently limited by other words.

132. The Alleghany and Monongahela Rivers form the Ohio. When two nouns refer to the same thing, the article precedes the first only.

133. I rejoice that there is another and better world. The adjectives refer to the same noun, hence need but one article.

134. The water is about six *fathoms* deep. *Six* expresses a plural idea, hence *fathoms* must be plural.

135. Henry or William will give us *his* company. Two or more singular nouns connected by *or* constitute a singular antecedent.

136. Those two boys must not speak to *each other*. *One another* is used in reference to more than two.

137. Bismarck is greater than any *other* German statesman. The latter term of comparison must not include the former.

138. She is *so* extravagant a woman. Adverb (*so*) is required to limit the adjective.

139. Have you *Webster's* or Worcester's dictionary? When common possession is not intimated each word takes the sign.

140. Adam was *Cain and Abel's* father. Two words denoting common possession take the possessive sign but once, and at the end.

141. I went to *Smith, Brown & Company's* store. See above.

142. I owe thee a heavy debt, and *wilt thou* not allow me to repay it? The solemn form once commenced must be continued.

143. Here is a pupil *who* possesses fine talents. *Who* is used in speaking of persons.

144. Virtuous effort and not depraved genius *wins* the prize. Two or more singular subjects connected by *and*, when taken separately, require a singular verb.

145. The fragrant myrtle and sweet-scented woodbine *render* the air in this spot truly delicious. Subjects connected by *and* denoting different persons and things taken together require the plural.

146. Wisdom, virtue, happiness, *dwell* with the golden mediocrity. The subject is plural, implying that the three are taken together, as the subject of *dwell*.

147. In that transaction their safety and welfare *are* most concerned. The subjects are connected by *and*, hence plural.

148. When *shall* we three meet again? *Shall* in the first person denotes simple futurity.

149. I intended to be at home when you called. A common error: *to have been* represents the action as completed at the time of the principal verb, whereas it should be future in regard to it.

150. The flowers smell very *sweet* and look *beautiful*. *Sweet* and *beautiful* are adjectives belonging to *flowers*.

151. Did you expect *to hear so* poor a sermon? Observe sequence of tenses as in No. 149.

152. By letters of the third of May we learn that the West India fleet arrived *safe*. *Safe* expresses the condition in which the fleet arrived.

153. There *was* a great number of spectators. The subject of *was* is the singular noun *number*.

154. What sounds *has* each of the vowels? The subject of *has* is the singular pronoun *each*.

155. The committee *has* attended to *its* business. If the collection is regarded as a unit, the verb must be in the singular.

156. My flesh and my heart *fail*. A plural subject in the common form requires a plural verb in the common form.

157. High pleasure and luxurious living *beget* satiety. The verb must agree with the subject in number.

158. We had *lain* on the ground all night. Here is required the intransitive verb *lie, lay, lain*.

159. She is as peevish as a *sitting* hen. *Sit* is the intransitive verb.

160. After *lying* awhile in this position, he *rose* up. The intransitive verbs *lie* and *rise* are required.

161. The man could neither read *nor* write. *Neither, nor*, are correlatives.

162. Which of the group of men is the *tallest?* Superlative is required when more than two are compared.

163. An account of all the great events in all parts of the world *is* given in the daily papers. *Is* must agree with its subject, *account*.

164. He is a man of *remarkably* clear intellect. An adverb is needed to modify the adjective *clear*.

165. Either you or I *am* in the way. The verb agrees with the subject nearest it.

166. That is seldom or *never* the case. *Never* is an adverb of denial and corresponds to *seldom*.

167. The following treatise, together with those that accompany

it, *was* written several years ago. A parenthetical clause does not affect the principal verb.

168. That is either a *man's* or a woman's voice. No common possession signified, hence the sign is repeated.

169. Of all the qualities of style, clearness is the most important. The superlative requires *clearness* to be included in *qualities*.

170. *When*, conjunctive adverb; as a subordinate conjunction, it connects the dependent clause with the principal; as an adverb of time, it modifies *does; thine*, pronoun, personal, 2nd person, singular, (declension) *thou, thy* or *thine, thee*, possessive case, limiting *alms*, solemn style; *let*, verb, irregular, *let, let, let*, transitive, active, imperative, 2nd person, singular, agrees with *thou* (understood); *know*, verb, *know, knew, known*, irregular, transitive, active, infinitive, and depends on *let* (*to* omitted); *what*, relative pronoun (*that which*), neuter, 3rd person, singular, objective case, the object of *know* and *doeth; doeth* is a verb, *do, did, done*, irregular, transitive, active, indicative mode, 3rd person, singular, and agrees with *hand*.

171. *New-born*, an adjective, descriptive, common, compound, limits *child; weeping* is a participle, present, active, from the irregular verb *weep, wept, weeping, wept*, relates to *child; sat'st*, verb, *sit, sat, sat*, irregular, intransitive, indicative, past, 2nd person, singular, agrees with *thou; thee*, pronoun, personal, 2nd person, singular, declined *thou, thy* or *thine, thee*, objective case, object of *around; live*, verb, *live, lived, lived*, regular, intransitive, imperative, 2nd person, singular, agrees with *thou* (understood); *sinking* is a present, active participle, from the irregular verb *sink, sunk* or *sank, sunk*, relates to *thou; while*, conjunctive adverb of time, modifies *weeping* and *smiled*, and joins the dependent and principal clauses.

172. *To have been*, an infinitive, from *be* or *am, was, being, been*, irregular, intransitive, and depends on *seem; only*, adverb of degree, limiting *like; like*, adverb of manner, compared *like, more like, most like*, positive degree, and belongs to *to have been; boy*, common noun, 3rd person, singular, masculine, declined *boy, boy's, boy*, objective case, preposition (*unto*) being understood; *now*, adverb of time present, belongs to *finding; then*, adverb of time past, belongs to *finding; finding* is a transitive, active, present participle, from *find, found, finding, found*, used as a noun, neuter gender, 3rd person, singular, objective case, governed by *in; than*, conjunction of comparison, connects *smoother* and *prettier* and *ordinary; ordinary*, adjective, descriptive, common, compared *ordinary, more ordinary, most ordinary*, limits *pebble* or *shell* (understood); *whilst*, conjunctive adverb of time, modifying *to have been* and *lay*, and joining its own clause to the principal clause.

173. *These*, adjective pronoun, demonstrative, 3rd person, plural, neuter, objective case, in an elliptical construction with *like* (*unto* being understood); *that*, relative pronoun, 3rd person, singular number, neuter gender, to agree with its antecedent *grandeur*, nominative case, subject of *makes; revered*, passive participle, modifying

her; but, an adverb of degree, denoting exclusion or emphasis, belongs to *are; man's*, a contraction of *man is; man* is a common noun, 3rd person, masculine, singular, nominative case, subject of *is; is* is a verb, *be* or *am, was, been*, irregular, intransitive (neuter), indicative, present, 3rd person, singular, agrees with *man*.

174. *Like*, common adjective, descriptive, *like, more like, most like*, positive degree, and limits *host; leaves*, common noun, 3rd person, plural, neuter, objective case, in an elliptical construction with *like* (supply *unto*); *host*, common noun, collective, 3rd person, singular in form, plural in meaning, nominative case, subject of *are seen*.

175. *Shrieks*, common noun, neuter, third, plural, nominative case, subject of *come; wild*, common adjective, descriptive, *wild, wilder, wildest*, positive degree, and limits *shrieks; that*, pronoun, relative, third, plural, neuter, to agree with its antecedent *shrieks*, nominative case, subject of *cut; blades*, common noun, 3rd person, plural, neuter, objective case. "A noun or pronoun used without a governing word, but limiting another word like an adjunct, must be in the objective case." *Causing* is a participle, active, present, from the regular, transitive verb *cause, causing, caused, caused*, relates to *shrieks; creeping* is a participial adjective, from the irregular, intransitive verb *creep, crept, creeping, crept*, limits *blood; to chill* is an infinitive, present, active, from *chill, chilled, chilling, chilled*, relates to *blood*.

176. *When*, conjunctive adverb of time, modifying the two verbs *was* and *thought*, and joining the dependent clause to the principal clause; *nothing*, common noun, 3rd person, singular, neuter, objective case, object of *of; else* is an adjective, definitive, pronominal, limits *nothing; but*, preposition, shows the relation between *nothing* and *pleasure; pleasure*, common noun, abstract, 3rd person, singular, neuter, objective case, object of the preposition *but*.

177. *Seeing*, subordinating conjunction, causal, connects the two clauses; *ye*, pronoun, personal, 2nd person, plural, common gender, nominative case, subject of *were*.

178. *Even*, adverb of degree, belongs to *is counted; when*, conjunctive adverb of time, modifying the verbs *is counted* and *holdeth*, and joins the dependent to the principal clause adverbially; *is counted*, verb, *count, counted, counted*, regular, transitive, passive, indicative, present, 3rd person, singular, agrees with *fool*.

179. *More* and *worse* are adverbs limiting *struggle* and *are off; off*, adverb used in an idiom with *worse*, belongs to *are; the, the*, as here used, are in reality pronominal adverbs, meaning *by how much, by so much*.

180. *Worth* is an adjective, diverted from its noun use, descriptive, common, belongs to *people; speaking* is a participle used as a noun; it comes from the transitive, irregular, active verb *speak, spoke, speaking, spoken;* as a noun, it is neuter, 3rd person, singular, and objective case; *with* is an adverb of degree, diverted from its prepositional use, and belongs to *speaking*.

ANSWERS TO GRAMMAR, FIRST GRADE.

1. An adjective or noun is called a *factitive*, or *objective predicate*, when it is brought by the verb into relation with the direct object, as qualifying or describing that object: *They sang themselves hoarse; He made the water wine.*

2. Yes: two or more subordinate clauses of the same kind may have the same construction in a sentence, being joined together by coördinating conjunctions: *A bird that lay on the ground, and that could not fly, died.*

3. A *substantive clause* performs the office of a substantive or subject: *That the boy is dead is the substance of the letter.* A noun clause may be used in any construction proper for a noun: *I heard that he had gone.*

4. One that has one or more of its independent clauses complex.

5. Compound declarative sentence, composed of two complex members. *The wind bloweth where it listeth*, is the first. Principal clause, *the wind bloweth.*

Subject, *wind*
Modifier of subject, *the*
Predicate, *bloweth*
Modifier of predicate, *where it listeth* (*a*)
Analysis of adverb clause (*a*): Subject, *it*
Predicate, *listeth*
Connective, *where*

Second complex sentence has a compound predicate and two dependent clauses. Principal clause, *and thou hearest the sound thereof, but canst not tell.*

Subject, *thou*
Predicates: { *hearest*, *canst tell*
Objects: { *sound*, *whence it cometh* (*a*) *nor whither it goeth* (*b*)
Modifier of object, *the*
Modifiers of predicates: { *thereof*, *not*
Connective of predicates, { *but*
Analysis of noun clause (*a*): Subject, *it*
Predicate, *cometh*
Modifier of predicate, and connective, { *whence*
Analysis of noun clause (*b*): Subject, *it*
Predicate, *goeth*
Connective and modifier of predicate, { *whither*
Connective of dependent clauses, *nor*
Connective of the two sentences, *and*

6. Compound declarative sentence, composed of two complex members. First complex member, *No one who is a lover of money, a lover of pleasure, and a lover of glory, is likewise a lover of mankind.*

Subject, *one*

Modifiers of subject: { *no*; *who is a lover of money, a lover of pleasure, and a lover of glory* (*a*) }

Predicate, *is*

Modifier of predicate, *likewise*

Complement, *lover*

Modifiers of complement: { *of mankind*; *a* }

Analysis of adjective clause (*a*): Subject, *who*

Predicate, *is*

Complements: { *lover*; *lover*; *lover* }

Modifiers of comp.: { *of money*; *of pleasure*; *of glory* }

Connective, *who*

Analysis of second complex member: Principal clause, *but only he* (is a lover of mankind).

Subject, *he*

Modifiers of subject: { *who is a lover of virtue* (*a*); *only* }

Connective, *but*

Analysis of adjective clause (*a*): Subject, *who*

Predicate, *is*

Complement, *lover*

Modifiers of comp.: { *a*; *of virtue* }

Connective, *who*

7. Compound declarative sentence, composed of two complex members. The first is, *You stood still while he advanced.* Principal clause, *you stood still.*

Subject, *you*

Predicate, *stood*

Modifiers of predicate: { *still*; *while he advanced* (*a*) }

Analysis of adverb clause (*a*): Subject, *he*

Predicate, *advanced*

Connective, *while*

Analysis of second complex member: Principal clause, *For neither of you knew.*

Subject, *neither*

Modifier of subject, *of you*

Predicate, *knew*

Object, *what ought to be done* (*a*)

Connective, *for*

Analysis of noun clause (*a*): Subject, *what*
Predicate, *ought*
Modifier of predicate, *to be done*
Connective, *what*

8. Complex declarative sentence. Principal clause, *Nothing would have interested me more than to witness the play of passions.* First dependent clause, *that must thus have been evolved* (*c*). Second dependent clause, *had I been as cold-hearted* (*a*) *as I sometimes thought myself* (*b*), which modifies the verb, *would have interested.*

Analysis of principal clause:
Subject, *nothing*
Predicate, *would have interested*
Object, me
Modifiers of predicate: { *more than to witness the play of passions* (*a*) and (*b*)
Modifier of *play of passions*, { *that must thus have been evolved* (*c*)

Analysis of adjective clause (*c*):
Subject, *that*
Predicate, *must have been evolved*
Modifier of predicate, *thus*
Connective, *that*

Analysis of second dependent clause:
Subject, *I*
Predicate, *had been*
Complement, *cold-hearted*
Modifier of complement, *as*
Modifier of *as*, *as I sometimes thought myself* (*b*)
Connective, *if* (understood)

Analysis of adverb clause (*b*):
Subject, *I*
Predicate, *thought*
Object, *myself*
Modifier of predicate, *sometimes*
Connective, *as*

9. Complex declarative sentence. Principal clause, *I laid the money on the counter.*

Analysis of principal clause:
Subject, *I*
Predicate, *laid*
Object, *money*
Modifiers of predicate: { *on the counter* / *as I said* (*a*)
Modifiers of object: { *the* / *which I paid* (*b*)

Analysis of adverb clause (*a*):
Subject, *I*
Predicate, *said*
Connective, *as*

Analysis of adjective clause (*b*):
Subject, *I*
Predicate, *paid*
Object and connective, } *which*

10. Compound declarative sentence, composed of two complex members.
Analysis of first complex member: Principal clause, *I will go.*
Subject, *I*
Predicate, *will go*
Modifier of predicate, *whither thou goest* (*a*)
Analysis of adverb clause (*a*): Subject, *thou*
Predicate, *goest*
Mod. of pred., and connec., } *whither*

Analysis of second complex member: Principal clause, *I will lodge.*
Subject, *I*
Predicate, *will lodge*
Modifier of predicate, *where thou lodgest* (*b*)
Analysis of adverb clause (*b*): Subject, *thou*
Predicate, *lodgest*
Mod. of pred., and connec., } *where*
Connective of the two sentences, *and*

11. Complex declarative sentence, with a noun clause as object of a preposition. Principal clause, *I have sinned.*
Subject, *I*
Predicate, *have sinned*
Modifier of predicate, { *in that I have betrayed the innocent blood* (*a*)
Analysis of noun clause (*a*): Subject, *I*
Predicate, *have betrayed*
Object, *blood*
Mod. of object: { *the innocent*
Connective, { *in that* (in this way, *that*)

NOTE.—The dependent clause is equivalent to the prepositional phrase *by* (or *in*) *betraying the innocent blood.*

12. Complex. Principal clause, *and the moon and its broken reflection and its shadows shall appear as the symbol of love in heaven, and* (*as*) *its wavering image here, forever and forever.*

Subjects: { moon
reflection
shadows

Modifiers of subjects: { *the* / *its broken* / *its*
Predicate, *shall appear*
Complements: { *symbol* / *image*
Modifiers of *symbol*: { *the* / *of love*
Modifier of *love*, *in heaven*
Modifiers of *image*: { *its* / *wavering*
Modifier of entire phrase, *here*
Connective of subjects, *and*
Connective of appositives (complements), *and*
Connective of subjects and appositives (complements), *as*
Modifiers of pred.: { *forever and forever* / *as long as the river flows* (*a*) / *as long as the heart has passions* (*b*) / *as long as life has woes* (*c*)
Adverb clauses modifying the first *as* in each line: { *as the river flows* / *as the heart has passions* / *as life has woes*

13. Simple declarative sentence, with three infinitive phrases.
Subject, *we*
Predicate, *did think*
Object, *it*
Modifiers of obj.: { (to be) *writ down in our duty* (1) / *to let you* (2)
Modifier of *let*, (to) *know it* (3)

14. Complex sentence. Principal clause, *you should not set out.*
Subject, *you*
Predicate, *should set*
Mod. of pred.: { *not* / *out* / *unless you are certain* (*a*) *that he is there* (*b*)
Analysis of adverb clause (*a*):
Subject, *you*
Predicate, *are*
Complement, *certain*
Connective, *unless*
Modifier of complement, *that he is there* (*b*)
Analysis of adverb clause (*b*):
Subject, *he*
Predicate, *is*
Modifier of predicate, *there*
Connective, *that*

15. Complex sentence. Principal clause, *he erected the wall.*
Subject, *he*
Predicate, *erected*

Object, *wall*
Modifier of pred., *in order that he might stop trespassing* (*a*)
Modifier of object, *the*
Analysis of adverb clause (*a*): Subject, *he*
Predicate, *might stop*
Object, *trespassing*
Connective, *in order that*

16. Complex sentence. (*What* may be considered equivalent to *that which*, or the dependent clause may be regarded as the subject of *remains*.)

Subject, *what I have done* (*a*)
Predicate, *remains*
Modifier of predicate, *to be seen*
Analysis of the noun-clause (*a*): Subject, *I*
Predicate, *have done*
Object, *what*

17. Complex sentence. Principal clause, *more brief appear our life's succeeding stages.*

Subject, *stages*
Modifiers of subject: { *succeeding* / *our life's*
Predicate, *appear*
Modifiers of predicate: { *more brief* / *we live the more* (*a*)
Analysis of adverb clause (*a*): Subject, *we*
Predicate, *live*
Mod. of pred., *the more*
The is used as an adverb modifying *more*.

18. Complex sentence, with three infinitive phrases, one infinitive having a clause as a direct object.

Subject, *it*
Predicate, *is*
Complement, *ours* (our privilege)
Modifier of predicate, *not*
Modifiers of complement: { *to separate* / *to show* / *divide* (to)
Object of *separate*, *skein*
Modifiers of *skein*: { *the* / *tangled* / *of will and fate*
Object of *show*, { *what metes and bounds should stand upon the soul's debatable land* (*a*)
Modifier of *divide*, *between choice and Providence*
Object of *divide*, *circle*
Modifiers of object: { *the* / *of events*
Connective, *and*

Analysis of noun clause (*a*):
Subjects: *metes and bounds*
Modifier of subjects, *what*
Predicate, *should stand*
Modifier of predicate, *upon the soul's debatable land*

19. Complex sentence. Principal clause, *Every individual has a place to fill in the world, and is important in some respect.*
Subject, *individual*
Modifier of subject, *every*
Compound predicate, *has* and *is important*
Complement, *important*
Object, *place*
Modifiers of object: { *a* / *to fill in the world*
Modifier of predicate *is*: { *whether he chooses to be so or not* (*a*)
Modifier of complement, *in some respect*
Connective, *and*
Analysis of adverb clause (*a*):
Subject, *he*
Predicate, *chooses*
Object of *chooses*, infinitive phrase *to be so or not*
Modifiers of the infinitives: { *so* / *not*
Connective, *or*
Connective between principal and dependent clauses, *whether*

20. Complex sentence. Principal clause, *Its biting air did but trace itself in loveliest frost-work of fancy on the many windows of that self-centered and cheerful soul.*
Subject, *air*
Modifiers of subject: { *its* / *biting*
Predicate, *did trace*
Object, *itself*
Modifiers of predicate: { *if the outward world was cold to Shakspere* (*a*) / *in loveliest frost-work* / *on the many windows* / *but*
Modifier of *frost-work*, *of fancy*
Modifier of *windows*, { *of that self-centered and cheerful soul*
Analysis of (*a*):
Subject, *world*
Modifiers of subject: { *the* / *outward*
Predicate, *was*
Complement, *cold*

Modifiers of predicate: { *to Shakspere* / *as poets are wont to whine* (*b*) }
Connective, *if*
Analysis of (*b*):
Subject, *poets*
Predicate, *are*
Complement, *wont*
Modifier of *wont, to whine*
Connective, *as*

21. Those that fly when they are on the way to battle may fight another day.

22. This man is in deep sorrow because his child is dead. This man whose child is dead is in deep sorrow.

23. The ship leaps, it is said, from billow to billow.

24. "In Holland the stork is protected by law, because it eats the frogs and worms that would injure the dikes."

25. It may be placed last in a sentence: "they never fail *who die in a just cause.*" It may be placed first (an inverted construction): "*who noble ends by noble means obtains*, that man is great indeed." It may follow the object: "I know a bank *whereon the wild thyme blows.*" It may follow the subject: "*he that hath wife and children* hath given hostages to fortune."

26. Last: "He died *as he lived.*" First: "*when I was a child* I thought as a child." Incorporated in the sentence: Although the wound soon healed, yet, *as he ran*, he shrieked for pain.

27. Noun { Proper / Common { Participial / Compound / Collective / Abstract } } Modifications { Gender / Person / Number / Case / Rule of syntax }

28. In their use and office in the sentence (subject, complement, object, possessive, or appositive modifier); in their modifications to denote gender, number, case.

29. By others' faults wise men correct their own.

30. Personal pronouns compounded with *self* and used reflexively.

31. Upon the presence or absence of sex in that which the noun names.

32. The co-ordinating relative is equivalent to a pronoun and conjunction together: "I called on Henry, *who* told me what happened" (and he). *Who* and *which* are thus used. In the sentence, The man *that* I called on, *that* is the relative of restriction.

33. The *above* passage.

34. Both have comparison, classification, and belong to other words. They differ in their mode of qualification, adjectives limiting nouns, and adverbs verbs, etc.

35. Numeral adjectives which tell how many fold: *single, double, twofold.*

36. *Yes* and *no.* They never modify other words like adverbs, but are in themselves complete answers.

37. By suffixes, *er, est, ishly, some;* by compounding two adjectives.

38. Those of place and motion: *before, above, in, out, up, down, below,* etc.

39. Those that come from pronominal roots and are divided into what may be termed *her, they, who* classes—*here, hither, hence; there, thither, thence, then, thus, the; where, whither, whence, when, why, how.*

40. A pronominal adjective takes the place of a noun and an adjective. A pronoun is used instead of a noun.

41. "*What* by entreaty and *what* by threatening I succeeded." "We meet *but* to part."

42. Definition (*b*), because it covers all the various uses of the verb.

43. By omitting the *object* when the intention is to make prominent the *act:* "She reads well;" "Men build and time pulls down;" "I wash, bake, brew, scour, and do all myself."

44. It is not. Mode is the expression of the action in regard to the subject, and the infinitive has none. The infinitive is, in reality, a verbal noun.

45. The second, because these names denote more clearly the time.

46. *Drunk* may be an adjective. *Hanged* means suspended by the neck until dead; *hung* means suspended merely.

47. The participle leans to the adjective, the infinitive to the noun. "I am studying" means "I am in the state of studying;" but "I can (to) study" means "I am able to do the thing called studying."

48. He *must have been suffering* all this time.

49. Of the indicative and the infinitive: "I knew he could (to) learn it." Of the subjunctive and the infinitive: "I should hardly (to) believe you even then." Of the imperative and the infinitive: "May you (to) prosper."

50. One which has an object denoting the same person or thing as the subject: "He washed himself."

51. The former is subjunctive, implying a mere supposition contrary to fact. The latter is indicative, implying that the condition is assumed as a fact, and the conclusion built upon it.

52. *Shall* meant obligation or debt. Chaucer says, "The faith I *shall* to God." *Will* meant intention or resolution on the part of the agent, he being free to do as he pleases. "I will not go" implies that I choose not to go.

53. When it implies moral obligation and is combined with the

present infinitive. It is past when combined with the past infinitive.

54. Perfect; pluperfect.

55. "If he *is* your general, why do you not obey him?" "If he *be* your general, you will have to fight in the East."

56. Ideas of space, time, cause, means, purpose, etc., which control and limit the mind, are especially expressed by prepositions, whose office it is to show how such ideas affect or are related to one another; hence their name, *relation-words*.

57. They agree in their office of uniting words and phrases, and differ in the power of government.

58. *On the contrary, as well as, on the other hand, as soon as.*

59. *That.*

60. *Then, yet, as, but, since.* If it modifies the verb it is an adverb, but if it joins the dependent clause to the independent it is a conjunction. Such words frequently perform both offices, and are then called conjunctive adverbs.

61. *Oh* is used in exclamations of sorrow or surprise. *O* is used in direct address (the vocative case).

62. "I know *what* ails you." "*What* ails you?" "*What* news from Genoa?" "*What* with the rain and wind I was nearly drenched." "*What!* take my money and my life too?"

63. They are alike. *Alike* implies two things, without *both*.

64. I have a number of them. The adverb *quite* cannot modify a noun.

65. My brother, my sister, and I will come. The compound personal pronouns are used for emphasis, but never take the place of the simple pronouns.

66. Did mankind but love *one another*, it would be something. The reciprocal pronoun *each other* is used in reference to two; *one another*, to any number.

67. I really wished to know. The adverb must precede the word to which it belongs.

68. I *would* rather not do it. The idiom is simplified by supposing "would do" a potential form, modified by *rather*.

69. If I *be* not mistaken the number is *twenty-six*. The subjunctive is needed because doubt is expressed. The numeral should be written.

70. I have compassion on the multitude because they *have continued* with me three days. Present-perfect tense required, because the action was begun in past time and continued into the present.

71. A hasty reading would not enable one to discover that this *is* an essay. An unchangeable truth is expressed by the present tense.

72. Destitute of principle, he did not regard his family, his friends, or his reputation. *Neither, nor*, refer to *two* objects of comparison.

73. When sickness, infirmity, or reverse of fortune affects us, the sincerity of friendship is tested. Several singular subjects unconnected, or connected by *or*, require a singular verb.

74. The committee were divided in their opinions. When reference is had to the individuals composing the collection, the collective noun is considered plural.

75. Each of them in *his* turn receives the benefits to which *he* is entitled. The distributive pronouns are singular subjects.

76. Those things in which I will appear unto thee. Relative pronouns are not limited by articles and adjectives.

77. The atmosphere being clear, and my sight good, etc. Absolute phrases are required here, as adverbial modifiers of the predicate.

78. The fact of *my* being a stranger to him does not justify his conduct. *Being* is a verbal noun limited by *my*, and the object of *of*. *Me* is not the object of *of*.

79. I *should* be delighted if you *would* go. *Should* in the first person denotes that the assertion depends on some condition beyond the speaker's will.

80. The former implies volition, and is equivalent to *I should wish to do it;* the latter expresses simple futurity, without reference to the will of the subject, implying, *I might not wish to do it, but I shall do it, nevertheless.*

81. The first expression shows that the author is following up the plan to which he has committed himself; the latter indicates a new start, and hence the auxiliary of resolution is used.

82. The former implies a future action independent of the desires of the subject; the latter, the desire of the subject independent of its fulfilment.

CHAPTER V.

ORTHOGRAPHY AND ORTHOEPY.

For Third Grade.

1. Define orthography.
2. How do the letters and elementary sounds of the language compare as to number?
3. What are vocals (tonics), sub-vocals (sub-tonics), and aspirates (atonics)? Give several examples of each.
4. Name and define the vowels and consonants.
5. State when *w* and *y* are vowels.
6. Which of the letters are respectively labials, dentals, palatals, and nasals, and on what is the classification founded?
7. What are the semi-vowels, liquids, and mutes?
8. What is a syllable?
9. Classify words according to the number of syllables.
10. What is a primitive word? A derivative word? Compound word? Give an example of each.
11. Define the terms prefix and suffix, and give examples.
12. What is a root? Give example of a word having a root.
13. What are diphthongs and triphthongs? Into what classes are they divided? Give an example of each.
14. What is syllabication?
15. What is essential in every syllable?

16. What rules of spelling are observed in forming *expelled* from *expel, traveler* from *travel, happily* from *happy, dying* from *die, drying* from *dry, peaceable* from *peace, inference* from *infer, equipped* from *equip*?

17. What is the rule for dividing a word at the end of a line?

18. What are cognates (correlatives)? Give two examples.

19. Give the distinction in use between the apostrophe and period in connection with abbreviated words.

20. Write the customary contraction of *will not, shall not, cannot, does not, never, it is, ever, should not, madame, mademoiselle, messieurs.*

21. What are the organs of speech?

ORTHOËPY.

REMARKS.—A knowledge of the correct pronunciation of words, according to some accepted standard, is now very generally demanded as an essential part of a teacher's qualifications.

Of the words most usually mispronounced, a large number are here given. These have been selected as occurring in sentences, as it is believed that the correct pronunciation of a word as it occurs in a sentence is remembered easier than if printed as a single word.

Pronounce correctly the italicized words in the following sentences:

22. All their amusements were intolerably dull and *decorous.*

23. What a deal of secrets Amelia learned which old Mrs. Pinkerton herself had no *cognizance* of.

24. Miss Saltire was too cold for a *confidant.*

25. In those *booths* of Vanity Fair, people seldom do miss each other.

26. The sons whom he had plunged into *dishonor* and poverty—the daughters whom he had *inveigled* into perdition.

27. And the moral to be inferred from Mrs. Bute's tale was that the knavery of the pair was *irremediable.*

28. The *abdomen* is well guarded by the thorax.

29. Where are the *jugular* veins?

30. Describe the *perspiratory* glands.

31. Copyright spoils the native *aroma* of the popular *romance.*

32. "In the *bivouac* of life."

33. He had learned to despise *bombast* and tinsel.

34. He advances strong and *irrefragable* arguments.

35. "The cat's dark *silhouette* on the wall
A *couchant* tiger's seemed to fall."

36. The *mirage* loomed across her way.

37. It was a place where a tree had been *scathed* by lightning.

38. "The *flagon* last night," thought he, "has addled my poor head sadly."

39. "And *lichens* grow and inconspicuously blossom."

40. "And still with a voice of *dolorous* pitch,
She sang the 'Song of the Shirt.'"

41. "Space for his lake, his park's extended bounds,
Space for his horses, *equipage* and hounds."

42. The *crystalline* lens is situated immediately behind the iris.

43. *Quinine* is the general remedy for malaria.

44. *Chlorine* gas has a great affinity for hydrogen.

45. "And he paused, reflecting on his own *consummate hypocrisy.*"

46. "Could any sensible man suppose that peace wasn't really concluded, after we'd actually sung *Te Deum* for it, sir?"

47. "Jos. Sedley was splendid. He was better than ever; his shirt frill *flaunted* gorgeously out of his *variegated waistcoat.*"

48. "*Buoyant* my limbs, and keen and bright my glance,
For that brief space I was a boy *again*."

49. "And lo! she had changed,—in a few short hours
Her *bouquet* had become a garland of flowers."

50. "Can'st thou bind the sweet influences of *Pleiades*?"

51. "I stood within the *Coliseum's* wall,
'Midst the chief relics of all-mighty Rome."

52. I would rather live in *squalor* than accept support from a *dishonest* man.

53. "Be wise to-day; 'tis madness to defer:
Next day the fatal *precedent* will plead."

54. A motion to adjourn takes *precedence* of all other business.

55. *Cinchona* is another name for Peruvian bark.

56. "From his half *itinerant* life also, he was a kind of travelling gazette."

57. "This prostration and sweet unrepining obedience *exquisitely* touched George Osborne."

58. He was making a *tremendous sacrifice* in marrying this young creature.

59. But upon these *hymeneal projects*, Mr. Dobbin went to seek John Sedley, where the broken-down old gentleman *used* to betake himself daily, write letters, and show you those worn *greasy* documents offering *condolence* and support."

60. "That in the captain's but a *choleric* word,
Which in the soldier is flat *blasphemy*."

61. I knew once a very *covetous*, sordid fellow, who used to say, Take care of the pence, for the pounds will take care of themselves."

62. "Where perhaps some beauty lies,
The *cynosure* of neighboring eyes."

63. "Bid me *discourse*, I will enchant thine ear."

64. "A little bench of heedless bishops here,
And there a chancellor in *embryo.*"

65. "Joys too *exquisite* to last,
And yet more exquisite when past."

66. "Rebecca laughed in her face with a horrid, sarcastic *demoniacal* laugh."

67. "It was *bruited* about that he was admitted into Dr. Swishtail's academy."

68. Ammonia gas is *irrespirable.*

69. There's not a fitter officer though he is not an *Adonis.*

70. A head appeared between the *interstices* of the shutters.

71. A wise ruler does not *subject* a good *subject* to unnecessary taxation.

72. In the *survey* you are undertaking, do not omit to *survey* that Smith plot adjoining the town lot.

73. He *extolled* his wares beyond their worth.

74. "To profess regard while inwardly full of contempt is the action of a *sycophant.*"

75. "I know a bank whereon the wild *thyme* grows."

76. "Monastic brotherhood, upon rock *aerial.*"

77. "Lo, where the stage, the poor degraded stage,
Holds its warped mirror to a *gaping* age."

78. "Every man is the *architect* of his own fortune."

79. "I have lost the immortal part of myself, and what remains is *bestial.*"

80. "A *bevy* of fair women."

81. "A *falcon,* towering in her pride of place,
Was by a *mousing* owl hawked at and killed."

82. "No *Indian* prince hath to his palace
More followers than a thief to the *gallows.*"

83. "Or I will scarce think you have swam in a *gondola.*"

84. "Of all the griefs that *harass* the distrest,
Sure the most bitter is a scornful jest."

85. "Where'er we tread, 'tis *haunted,* holy ground."

86. "Hypocrisy is the *homage* vice pays to virtue."

87. Mark the syllable taking the primary accent in these words: arbutus; enervating; cognomen; coadjutors; combative; lyceum; museum; allopathic; homœopathic; allopathy; homœopathy; acclimated; condolence; monastery; perfume (noun); perfume (verb); extant; albumen; aspirant; bitumen; commandant.

88. Indicate, with the proper diacritic marks, the sound of each of the italicized letters in the following words: c*o*nnoisse*ur*; s*ur*t*ou*t; eleg*i*ac; ex*a*ct; f*au*cet; p*er*f*u*me; s*oo*t; wh*a*t; b*ou*quet; h*au*nted; e*x*haust; c*ar*b*i*ne; fran*chise;* *a*ltercation; bron*chi*tis; f*o*rward; p*a*st; *gey*ser; li*th*e; na*s*al.

ANSWERS TO ORTHOGRAPHY AND ORTHOËPY, THIRD GRADE.

1. Orthography is the correct writing or spelling of words by means of letters.

2. There are twenty-six letters and forty sounds, simple and compound.

3. Pure tones produced by the voice with but slight use of the organs of speech; tones produced by the voice modified by the organs of speech; mere breathing modified by the organs of speech. Vocals, *ā, ē, ī, ō*; sub-vocals, *b, d. g, l, m, n*; aspirates, *f, h, p, ch, sh.*

4. The vowels are *a, e, i, o, u*, and sometimes *w* and *y*. They are the letters that represent the vocal elements and form syllables by themselves. The consonants are *b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z*. They are the letters that represent the sub-vocals or aspirate elements.

5. In all cases except when either precedes a vowel heard in the same syllable.

6. The labials are *b, p, f, v*, and *m*; the dentals, *d, t. s, z, j, g* when equivalent to *j*, and *c* when equivalent to *s*; the palatals, *k, g, r, l, q*, and *c* when equivalent to *k*; the nasals, *m* and *n*. They are classified according to the organs by which they are produced.

7. The semi-vowels are *f, h, j, l, m, n, r, s, v, w, x, y, z*, and *g* and *c* soft; the liquids are *l, m, n, r*; the mutes are *b, d, k, p, q, t, c* and *g* hard.

8. A word or part of a word uttered by one impulse of the voice.

9. A word of one syllable is a monosyllable; two syllables, a dissyllable; three syllables, a trisyllable; four or more syllables a polysyllable.

10. One that cannot be traced to any other word in the language for its origin; example, *make*. A word formed from a primitive word; example, *doubtful*. A word formed of two simple words; example, *Anglo-Saxon*.

11. A prefix is a syllable placed before a word; as, *dis-obey*. A suffix is a syllable placed after a word; as, *obey-ing*.

12. A word from which other words are formed. *Conduct* (the root is *duct*).

13. A diphthong is the union of two vowels in one syllable; a triphthong, the union of three vowels in one syllable. Diphthongs are divided into proper and improper. Example of proper diphthong, *voice;* of improper, *beat*.

14. Separating a word into its syllables.

15. It must contain at least one vowel.

16. Expelled : a dissyllable accented on the last syllable, ending in a single consonant preceded by a single vowel, doubles the final consonant on taking a suffix beginning with a vowel.—Traveler : the *l* is not doubled because the word is not accented on the last syllable.—Happily: words ending in *y* preceded by a consonant change *y* into *i* on adding a suffix.—Dying : silent *e* is dropped before adding a suffix beginning with a vowel, and the *i* is changed into *y* to prevent doubling the *i*.—Drying . final *y* remains unchanged when a suffix beginning with *i* is added.—Peaceable : words ending in *ce* or *ge* retain the *e* before the suffixes *able* and *ous*.—Inference : the *r* is not doubled because the accent in the derivative is not on the same syllable as in the primitive.—Equipped, accented on the last syllable, ends in a single consonant, preceded by a single vowel after *qu*, hence the final consonant is doubled.

17. Divide it according to its syllables.

18. Cognates are letters whose sounds are made by the same organs of speech in a similar position : *f* is a cognate of *v*, and *k* of *g*.

19. If part of the word is omitted and the final letter retained, as in *rec'd*, the apostrophe is used ; when the last letters of a word are omitted, as in *Jan.*, the period is generally used.

20. Won't, shan't, can't, doesn't, ne'er, it's, e'er, shouldn't, Mme., Mlle., Messrs.

21. The lips, teeth, tongue, and palate.

22. De-cō'rous.

23. Cŏg'ni-zance.

24. Con-fi-dant'.

25. Booths.

26. (Diz-hon'or), (in-vē'gl).

27. Ir-re-mē'di-a-ble.

28. Ab-dō'men.

29. Jūg'u-lar.

30. Per-spīr'a-tory.

31. Arō'ma, ro-mance'.

32. (Bĭv'wak).

33. (Bŭm'bast).

34. Ir-rĕf'ra-ga-ble.

35. (Sĭl'oo-et), couch'ant.

36. (Mĭ-räzh').

37. (Skāthed).

38. Flăg'on.

39. (Lī'kens).

40. Dŏl'or-ous.

41. (Ek'wĭ-pej).

42. Crȳs'tal-līne.
43. Quī'nīne.
44. Chlō'rīne.
45. Con'sum-māte, hy-poc'rĭ sy.
46. Te Dē'um.
47. Flăunt'ed, vā'ri-e-gāt-ed, wāist'cōat.
48. Buoy'ant, (a-gĕn').
49. (Bōō-kā').
50. (Plē'ya-dez).
51. Cŏl-i-sē'um.
52. Squăl'or [Imperial Dictionary], (diz-hŏn'est).
53. Prĕc'e-dent.
54. Pre-cēd'ence.
55. (Sin kō'na).
56. Ĭ-tĭn'er-ant.
57. Ex'qui-sĭte-ly.
58. Tre-mĕn'dous, (săc'ri-fīz).
59. Hȳ-men ē'al, prŏj'ects, (yu̇zd), (grēaz y), con-dō'lence.
60. Chŏl'er-ic, blăs'phe-my.
61. (Kŭv'et-us).
62. (Sĭn'o-shu̇r).
63. Dis-cōurse'.
64. Ĕm'bry o.
65. (Eks'kwĭ-zĭt).
66. Dĕm-o-nī'ac-al.
67. Bru̇it'ed.
68. Ir-rĕs'pi-ra-ble.
69. A-dō'nis.
70. In'ter-stĭc-es.
71. Sub-ject', sub'ject.
72. Sur'vey, sur-vey'.
73. Ex-tōl'led.
74. Sȳc'o-phant.
75. (Tĭm).
76. Ā-ē'rĭ-al.
77. Găp'ing.
78. Ar'chi-tect.
79. (Bĕst'yal).
80. Bĕv'y.
81. (Faw'kn), mouz'ing.
82. (Ĭnd'yan), (găl'lus).

83. Gŏn′do-la.

84. Hăr′ass.

85. Hăunt′ed.

86. Hŏm′age.

87. Arbu′tus, ener′vating, cogno′men, coadju′tors, com′bative, lyce′um, muse′um, allopath′ic, homœopath′ic, allop′athy, homœop′athy, accli′mated, condo′lence, mon′astery, per′fume (noun), perfume′ (verb), ex′tant, albu′men, aspir′ant, bitu′men, commandant′.

88. Cŏnnoisseur, sŭrtout, elegiac, exact, fauçet, perfūme, soot, what, bouquet, haunted, exhaust, cärbīne, franchīse, ăltercation, bronchītis, fôrward, päst, geȳser, lithe, nasal.

CHAPTER VI.

PHYSIOLOGY.

For Second Grade.

THE BONES.

1. What is the skeleton? Of how many bones is it composed?
2. Of what use is the skeleton?
3. Name three natural divisions of the bones of the skeleton.
4. What is meant by the extremities?
5. Name the bones of the head.
6. What peculiarity have the bones of the skull?
7. How many ribs are there?
8. What are vertebræ, and how many are there?
9. Name the bones of the upper extremities.
10. Name the bones of the lower extremities.
11. Name the bones of the pelvis.
12. What classification of the bones is made with regard to form?
13. Draw a longitudinal and a transverse section of one of the long bones, and explain its structure.
14. Of what two parts is bone composed?
15. Of what use is each part?
16. In what ways can these parts be obtained separate from each other?
17. What are the proportions of these parts in childhood, in middle life. and in old age?

18. What is the marrow of the bone, and of what use is it?

19. What is the periosteum, and what purpose does it serve?

20. What are movable joints? What immovable joints?

21. Into what four kinds are movable joints divided? Give an example of each kind.

22. What are ligaments, and what purpose do they serve?

23. What are cartilages, and of what use are they?

24. Define synovial membrane, and tell where found.

25. What is the patella, and what purpose does it serve?

26. How are bones nourished?

27. What cavities are there in the skeleton?

28. Describe the process by which a broken bone is repaired.

THE MUSCLES AND THE INTEGUMENT.

29. What are the muscles?

30. Distinguish between voluntary and involuntary muscles.

31. Describe fully the structure of the muscles.

32. State the difference between the motions called flexion and extension.

33. What are tendons or sinews?

34. In what cases are the muscles without tendons?

35. Locate the following muscles: biceps, triceps, deltors, sartorius, pectoralis, erector spinæ, gastrocnemius, adductor, rectus femoris.

36. What is the chief constituent of muscle substance?

37. What other use than organs of motions have the muscles?

38. What is necessary for muscles to be healthy and well developed?

39. What results from violent and spasmodic exercise?

40. What direct effect does alcohol often have upon the muscles?

41. About how many muscles are there in the body?

42. What is meant by the integument or skin?

43. Describe the structure of the skin, naming its parts?

44. What office does the skin perform?

45. Describe the nail and its uses.

46. Describe the hair and its uses.

47. What offices do the nails and hair perform?

48. Account for the difference of complexion in different persons.

49. What effect has the sun upon the complexion?

50. What is the cause of freckles?

51. Describe the sebaceous glands, and tell what purpose they serve.

52. Describe the perspiratory glands.

53. Distinguish between insensible and sensible perspiration.

54. How may it be shown that insensible perspiration is always taking place?

55. What purpose does perspiration serve?

56. What is the effect of checking the flow of perspiration?

57. Why is bathing important to health?

58. When should one bathe?

59. Of what value is soap?

FOODS.

60. What is meant by the term food?

61. Give several examples of each of the following classes of food: 1. Proteids or nitrogenous. 2. Fats. 3. Amyloids. 4. Minerals.

62. What are the principal chemical constituents of food?

63. Distinguish between organic and inorganic food-substances.

64. Of what importance is salt as a food? Lime? Water? Iron?

65. What objections are there to the use of veal and pork as articles of food?

66. Why are peas and beans valuable food?

67. What food contains all the elements necessary for complete nutrition?

68. Why is wheat so valuable a food?

69. Why is a mixed diet necessary?

70. What are condiments, and what substances come under this head?

71. Of what value is sugar as a food?

72. What properties does oatmeal possess as a food?

73. State the use of cooking food.

74. Why is frying objectionable?

75. Of what value are tea and coffee?

76. Of what value are cocoa and chocolate?

77. What value do fruits possess as articles of diet?

78. What danger arises from conducting water through pipes?

79. What purpose does lime serve in the body, and how is it obtained?

80. Why are skim-milk, buttermilk, and whey useful?

81. Why are potatoes especially valuable as food?

82. Why should an over-abundance of starchy food be avoided?

83. What do the grains contain besides starch?

84. Describe fish, oysters, clams, crabs, and lobsters as articles of diet?

85. Why is rice so valuable a food?

86. What general difference is there between stimulants and narcotics?

87. Can you name a substance that is both a stimulant and a narcotic?

DIGESTION.

88. What is meant by digestion?

89. Draw an outline diagram of the alimentary canal, and name its parts.

90. Name the organs of mastication and deglutition.

91. Draw a diagram of the permanent teeth on one side of the upper jaw, and give their names.

92. State the differences in number and character between the milk-teeth and the permanent teeth.

93. Describe the teeth.

94. Why should the teeth be brushed after eating?

95. What effect has tartar upon the teeth?

96. What is insalivation?

97. Describe the salivary glands.

98. What effect has saliva upon the food?

99. Locate the pharynx, and state what opens into it.

100. Describe the operation of swallowing.

101. What is ptyaline, and what power has it upon starch?

102. How are the salivary glands affected by tobacco-chewing?

103. What is mucous membrane?

104. What effect has alcohol on the mucous membrane?

105. What is the œsophagus?

106. Describe fully the stomach.

107. What is the effect upon the stomach of food received into it?

108. What are the properties of the gastric juice?

109. What is the temperature of the stomach?

110. Describe the glands of the stomach.

111. How does the gastric juice become mixed with the food?

112. What effect has alcohol on the gastric juice?

113. Describe the pylorus and its action.

114. What kinds of food are digested in the stomach?

115. What is chyme?

116. Why is eating fast injurious?

117. How are the intestines divided? Describe the small intestine.

118. What is an emulsion?

119. What digestion takes place in the intestines?

120. How is the movement of food in the intestines effected?

121. What is chyle? How does it differ from chyme?

122. What is the object of the mucous membrane of the intestine? How is it increased in extent?

123. Describe the villi, and state what they contain.

124. Describe the lacteals.

125. What effect has alcohol on the intestines?

126. What are the lymphatics?

127. Of what use are the follicles in the mucous membrane of the intestines?

128. What secretions enter the intestine near the pylorus?

129. Where is the liver situated, and what offices does it perform?

130. What effect has alcohol on the liver?

131. Describe the large intestine, the cæcum, and its appendage.

132. What effect has alcohol on the kidneys?

133. What do you understand by absorption?

134. What circumstances retard digestion?

135. What effect has opium upon digestion?

CIRCULATION.

136. Of what use is the blood?

137. What proportion of the weight of the body is estimated to be blood?

138. What is plasma? Of what two parts is it composed?

139. Of what use is each part?

140. Describe the corpuscles of the blood.

141. Draw a diagram of the heart, and name its parts.

142. What relation does the heart bear to the rest of the circulating apparatus?

143. What difference is there between the arteries and veins in structure?

144. What is the pulse?

145. How does venous blood differ from arterial?

146. Describe the valves of the veins, and tell why these valves are needed.

147. Why is it more dangerous to wound an artery than a vein?

148. Describe the aorta.

149. Through what means is the blood provided with new material and relieved of the old material?

150. Describe the action of the heart.

151. What are the capillaries, and what service do they perform?

152. Speak of the rapidity of the blood's circulation.

153. How are the movements of the heart affected?

154. Does the blood flow to or from the heart in the arteries? In the veins?

155. Where would you compress a bleeding artery to stop its flow? Where a vein?

156. What is meant by assimilation?

157. How are the nails, cartilages, and hair nourished?

158. What immediate effect has alcohol on the heart?

159. What change does it frequently cause in the substance of the heart?

160. What effect has alcohol upon the blood?

161. What are the three desirable qualities in clothing?

RESPIRATION.

162. What two objects are effected by the respiration?

163. What are the organs of respiration?

164. Describe the lungs.

165. What is the pleura?

166. Describe the trachea. The larynx.

167. What are the bronchial tubes, and what their office?

168. To what is the spongy lightness of the lungs owing?

169. What are the cilia, and what use do they probably serve?

170. Describe the movements necessary for an act of perfect respiration.

171. What effect has hurried respiration on the heart?

172. What is the office of the epiglottis?

173. What is the diaphragm, and what office does it fulfil?

174. For what purpose is air received into the lungs?

175. What is the constitution of atmospheric air?

176. What is the condition of the air that has just been breathed?

177. How can it be shown a class that carbonic acid is exhaled from the lungs?

178. What effects have carbonic-acid gas?

179. How can it be shown that water-vapor is exhaled?

180. Explain how the blood is changed from a blue to a red color.

181. If the expansion of the chest is restrained in any way, what influence is exerted upon the air cells?

182. Name two diseases of the lungs.

183. What are the effects of breathing impure air?

184. What is the temperature of the body?

185. Does alcohol enable a person to resist cold?

THE NERVOUS SYSTEM.

186. State fully what is meant by vegetable functions, and name them.

187. What is the object of the nervous system?

188. What two kinds of nerve-tissue are there? Which is the more abundant?

189. Where is each located?

190. What are nerve-filaments? What are nerves? What the neurilemma?

191. What is the function of nerves?

192. Describe the gray matter; the ganglia, and their function.

193. What three divisions has the brain?

194. How are the brain and spinal cord divided longitudinally?

195. Name and describe the three coverings of the brain and spinal cord.

196. Describe the cerebrum and its hemispheres.

197. What do the convolutions indicate?

198. What relation have the hemispheres with each other and with the body?

199. What is the office of the cerebrum?

200. Describe the spinal cord.

201. Which part conveys sensation? Which part motor impulses?

202. What are the spinal nerves?

203. Which of their roots convey sensation?

204. Which convey motor impulses?

205. What is the effect of irritating nerves midway in their course?

206. What are the cranial nerves? Whence do they issue? How many are there?

207. What is reflex action, and what is essential for its performance?

208. When are reflex actions recognized by the person in whom they occur?

209. How does the use of alcohol affect the brain?

210. How does the use of alcohol affect the will?

For First Grade.

THE BONES.

1. Why is the spinal column curved?
2. Which of the ball-and-socket joints is most easily dislocated? Why?
3. How are the vertebræ bound together.
4. What is the thorax?
5. What are the Haversian canals?
6. What is a centre of ossification?
7. Why is a person taller on getting up in the morning than on going to bed at night?
8. Why are there prominences and why depressions upon bones?
9. How is the spinal canal formed?
10. What is the object of the downward slope of the ribs?
11. When is entire ossification of the bones completed?
12. Name several causes of curvature of the spine.

THE MUSCLES AND THE INTEGUMENT.

13. Define a fibre. A tissue.
14. What are fasciculi?
15. What is the aponeurosis?
16. What are sphincter muscles?
17. What processes take place during sleep?
18. What effects follow insufficient sleep?
19. What can you say of the Achilles tendon?
20. Give a scheme of exercises to be practised daily by an average person, and tell what muscles each motion calls into action.
21. Name several agents or causes producing muscular contractility.
22. What are the papillæ, and what peculiar power resides in them?

23. What is an albino?

24. What connection has the condition of the skin with the general health?

FOODS.

25. What is the proportionate amount of water in the body?

26. What are trichinæ? What safeguard should be taken against them?

27. What results from a diet deficient of fat?

28. How does Indian corn differ from wheat and rye?

29. What is the percentage of alcohol in brandy? In rum? In whisky? In gin? In wine?

30. How do beer, ale, and porter compare in the amount of alcohol they contain?

31. Is alcohol a food?

32. What is the active principle of tea? Of coffee?

DIGESTION.

33. Name the salivary glands, and give their location.

34. How are fluids swallowed?

35. Why is more saliva than usual needed when one is speaking?

36. How has the knowledge of the working of the human stomach been largely ascertained?

37. What is the peritoneum?

38. Trace a mouthful of food through the alimentary canal, showing what changes occur.

39. What becomes of the water taken into the stomach?

40. What is the cause of thirst?

41. What are the accessory organs of digestion?

CIRCULATION.

42. What is the pericardium?

43. When and by whom was the circulation of the blood discovered?

44. Where are the jugular veins?

45. By which side and parts of the heart is pure blood transmitted?

46. How?

47. What is the function of the red corpuscles?

48. To what is the coagulation of the blood due, and of what use is coagulation?

49. What is a hemorrhage?

50. What is the link between the digestive and the circulating systems?

RESPIRATION.

51. How is voice produced, and upon what do its modifications depend?

52. Why are the lungs not fastened to the walls of the chest?

53. How long does it take every particle of air in the lungs to be expelled and new air to take its place?

54. What would result were the entire capacity of the lungs constantly used?

55. How are the blood and the air kept from mingling in the lungs while they are brought so near together that the air changes the blood?

56. What changes does the blood undergo in the pulmonary capillaries by respiration? What changes take place in the nutritive capillaries?

57. How is water prevented from getting into the lungs in any quantity?

58. How is the temperature of the body maintained?

59. What purpose does nitrogen serve in the air?

GENERAL.

60. Define anatomy, physiology, and hygiene.

61. Give the technical names to these: gullet, windpipe, knee-pan, large intestine, small intestine, shoulder-blade, collar-bone, breast-bone.

62. Where is the seat of vision?

63. What is the distinction between organic and inorganic matter?

64. Why will holding the nose make nauseating medicines less disagreeable to take?

65. In what instance is impure blood conveyed by arteries?

66. State some particulars in which the structure of man differs from that of the inferior animals.

67. What is the effect of tobacco on the system?

68. Mention some of the hurtful effects of snuff.

69. Why are cigarettes more injurious than tobacco used in other forms?

70. What vital processes are denominated vegetative functions, and for what reason?

ANSWERS TO PHYSIOLOGY, SECOND GRADE.

1. The bony framework of the body; composed of 212 bones.

2. To give firmness to the body.

3. Head, trunk, and limbs.

4. Arms and hands; legs and feet.

5. Frontal, occipital, parietal, temporal, sphenoid, ethmoid, nasal, malar, lachrymal, palate, turbinated, maxillary, vomer, malleus, incus, stapes.

6. They are formed of two plates, with a soft cushion between.

7. Twenty-four.

8. They are divisions of the spinal column, and are twenty-six in number.

9. Clavicle, scapula, humerus, ulna, radius, carpals, metacarpals, phalanges.

10. Femur, patella, tibia, fibula, tarsals, metatarsals, phalanges.

11. Ossa innominata, sacrum, coccyx.

12. Long bones, flat bones, and short, or square, bones.

13. The outer portion of a bone is dense and firm, but the inner part is spongy, and, in the case of the long bones, filled with marrow.

14. Animal and mineral matter.

15. The animal matter makes the bones pliable and elastic. The mineral matter affords strength and firmness.

16. By burning the bone the animal portion is consumed. If a bone is placed in dilute acid, the mineral portion will be dissolved.

17. In childhood the mineral portion of the bones is about one half, in middle life four fifths, and in old age seven eighths.

18. A fatty substance which affords nourishment to the bones.

19. The covering of the bones. It is a protection, and also affords a connection between the ligaments and the bones.

20. Movable joints are those that allow motion between two connected bones. The immovable joints do not allow movement.

21. Ball-and-socket joints, such as is found in the hip-joint. Hinge-joints, as seen in the elbow. Pivot joints of two kinds, as shown in the joining of the *atlas* and *axis*, and in the joint between the *radius* and the *humerus*.

22. They are stout cords that bind the bones together.

23. Tough tissue which covers the ends of the bones, thus forming a cushion to protect them. Cartilage is also found in various parts of the body.

24. This is a sac found between the ends of bones, which secretes a lubricating fluid.

25. A small bone of the knee, placed over the joint to protect it.

26. By the blood.

27. Abdominal and throracic.

28. The blood carries bone substance to the injured part, which is deposited there ; new bone is thus formed ; and in time the fracture is knit together.

29. The organs which afford motion to the body.

30. Voluntary muscles are under the control of the will ; the involuntary are not.

31. Muscles are composed of bundles of fibres, which in turn are composed of fibrillæ. The whole is covered by a sheath.

32. Flexion is a state of contraction; and extension is relaxation.

33. The extension of the sheath of the muscle.

34 In the broad, flat muscles.

35. In front of the upper arm ; on the back side of the upper arm ; extending from the upper arm to the breast ; used in crossing one thigh over the other ; from the breast to the inside of the arm ; moves the trunk backward ; used in moving the foot ; moves the thigh forward ; on the front of the thigh.

36. Muscles contain *myosin* and a variety of proteid substances, fat, inorganic matter, phosphates, etc.

37. Protection and warmth to the vital organs.

38. Regular and properly directed exercise.

39. The muscles are strained and thus injured.

40. It often changes the muscles into fat, making them flabby and weak.

41. About five hundred.

42. The outer covering of the body.

43. The skin consists of layers of cells. The outer layer is called the epidermis, and the deeper layer the dermis or cutis.

44. It protects the nerves and capillaries.

45. The nail is a modification of the skin, and gives firmness to the end of the finger.

46. The hair grows from minute depressions in the skin. It serves as a protection to the head.

47. The nails and hair protect the body.

48. Complexion depends on the amount of pigment-cells in the cuticle.

49. The sun develops this pigment. Hence the swarthy races of tropical climates.

50. Hardened sebaceous matter beneath the skin.

51. Small glands in the skin which secrete an oily substance which lubricates the skin.

52. Small spiral tubes leading from the blood vessels to the surface of the body.

53. Insensible perspiration is that which is constantly passing off from the pores, but which we cannot see. Sensible perspiration is that which can be seen and felt.

54. If the hand is pressed for a moment against a pane of glass, moisture collects upon the glass. This moisture is insensible perspiration from the body.

55. It carries off the waste matter from the blood, and keeps the body at an even temperature by evaporation.

56. Headache, fever, etc., will ensue.

57. Bathing keeps the pores open, allowing the waste matter to escape freely from the body.

58. At any time except immediately after eating. The morning is perhaps the best time.

59. By uniting chemically with the oily substances exuded from the body, soap renders them soluble.

60. That which nourishes the body.

61. Proteids: gluten, albumen, casein, etc. Fats: butter, oil, etc. Amyloids: starch, sugar, etc. Minerals: salt, alkaline carbonates, etc.

62. Carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur.

63. Organic food-substances are those which are derived from living forms, as animals, vegetables, etc. Inorganic food-substances are those derived from the mineral kingdom, as water, salt, lime, etc.

64. Salt excites some of the secretions, as the gastric juice and the saliva. Lime enters into the composition of the bones, teeth, etc. Water composes a large part of the substance of the body, and serves as the vehicle by which nourishment is conveyed to the different parts of the body. Iron serves as a strengthening element in the body.

65. It requires too long a time for the stomach to digest them.

66. Because they are rich in nitrogen.

67. Milk.

68. Because it is easy of digestion and contains nearly all the necessary elements which the body requires.

69. That a due proportion of all the necessary elements may be obtained.

70. Pungent materials, such as mustard, pepper, etc.

71. It is readily soluble in water, which renders it very easy of digestion.

72. It is rich in gluten and fat, and also contains starch and sugar.

73. Food is made more digestible by cooking.

74. In frying, the food is coated by an indigestible covering.

75. They contain a small per cent of nutritive elements and are reserve stimulants.

76. Cocoa and chocolate contain fatty matter, also albuminous and starchy materials.

77. Fruits are valuable as food on account of their appetizing qualities and their ability to regulate the digestive organs.

78. Water, being a universal solvent, will dissolve any metal with which it comes in contact.

79. It gives firmness to the bones, and is obtained from water and from various foods.

80. Because they contain casein.

81. They contain a large amount of amyloids.

82. It cannot be disposed of in the body, and produces skin-eruptions, unduly increases the adipose tissue about the heart and other organs, thus impairing health.

83. Gluten, lime, phosphorus, and some of the grains contain fats.

84. Fresh fish is easily digested ; crabs and lobsters are less easily digested ; clams, either raw or cooked, are difficult to digest ; oysters are very easily digested raw.

85. Because it takes but one hour to digest it.

86. Stimulants act as excitants upon the nerves, while narcotics stupefy them.

87. Opium.

88. The preparation and change which takes place in food before it can be absorbed into the system.

89. The mouth, œsophagus, stomach, small intestine, large intestine.

90. Tongue and teeth.

91. Incisor, canine, molar (single), molar (double).

92. Milk-teeth, 20 ; permanent teeth, 32 ; the milk-teeth are softer than the permanent set.

93. In the centre of a tooth there is a cavity, and about this the soft part of the tooth. Upon the outside is a hard substance called the enamel.

94. To remove any particles of food that may be lodged between them.

95. It loosens the gums, and makes them tender.

96. The mixing the food with saliva during the act of chewing.

97. The saliva is secreted by three pairs of glands situated upon the inside of the mouth. It is poured out when food is taken into the mouth.

98. It renders the food moist and more easily acted on by the digestive fluids. It also changes starch to sugar.

99. The pharynx is situated in the back part of the mouth. The Eustachian tubes open into it.

100. The food is carried to the back part of the mouth by the tongue, and the walls of the pharynx and œsophagus, contracting behind it, force it down into the stomach.

101. Ptyalin is the active property of the saliva, which changes starch to sugar.

102. They are rendered less susceptible to the contact of food.

103. The lining membrane of cavities opening upon the surface of the body.

104. It acts as an irritant.

105. The tube leading from the mouth to the stomach.

106. The stomach is a muscular pouch, wider than deep, larger upon the left side than upon the right, opening into the œsophagus and the small intestine.

107. It becomes congested, and its muscles contract and relax, giving a churning motion to its contents.

108. The active property of gastric juice is pepsin, which changes the nitrogenous parts of the food so that they can pass into the circulation.

109. About 98°.

110. They are depressions in the inner coat, from which issues the gastric juice.

111. By the churning motion before mentioned.

112. It hinders its secretion by weakening the coating of the stomach.

113. It is a valve situated at the right side of the stomach, which retains the food until it has been acted on by the gastric juice, and then allows it to pass into the intestine.

114. The nitrogenous.

115. The food after being acted on by the gastric juice.

116. The food is not sufficiently masticated, and the saliva is not thoroughly mixed with it.

117. They are divided into the large and the small intestines. The small intestine extends, with numerous convolutions, from the stomach to the beginning of the large intestine, in the lower part of the abdominal cavity.

118. A fluid holding oil in suspension.

119. The digestion of the amyloids.

120. By the contraction of muscles in the walls of the intestines.

121. The food in its liquid state after passing into the small intestine is called chyle. It differs from chyme in composition and in being an emulsion.

122. It serves as the lining to the intestine, and its surface is increased by its being thrown into folds.

123. The villi are minute projections on the lining membrane of the intestine. They contain minute absorbent tubes called lacteals, and a network of blood-vessels.

124. They are small tubes which convey the digested food from the intestine to the circulation.

125. Alcohol is an irritant to the mucous membrane, and often destroys some of the secreting glands.

126. They are small tubes which convey fluids from different parts of the body to the blood-vessels.

127. They secrete substances necessary for digestion.

128. The pancreatic juice and the bile.

129. It is situated below and behind the right side of the stomach. The liver takes water and fibrin from the blood, but adds corpuscles to it. Sugar is formed in the liver.

130. Alcohol hardens the liver.

131. The large intestine is divided into three parts, the ascending, transverse, and the descending colon. The cæcum is the dark cavity below the opening into the small intestine; its prolongation is a worm-like body called the vermiform appendage.

132. Alcohol irritates the kidneys, rendering them inflamed, which sometimes leads to Bright's and other diseases.

133. The passage of a fluid through a membrane.

134. Fast eating, insufficient mastication, exhaustion, mental distress, anger, drinking too much while eating, especially cold drinks, eating too much, irregularity in eating, and want of exercise.

135. Opium retards digestion.

136. The blood is the channel by which materials for nourishment are carried to different parts of the body, and by which also the waste matter is removed.

137. About one thirteenth.

138. The watery part of the blood. It is composed of serum and fibrin.

139. Serum gives the blood its liquid nature, and conveys in it the fibrin, which is the nutritious part.

140. They are round, flattened bodies which make up nearly half of the blood, being $\frac{1}{3\,5\,0\,0}$ of an inch in diameter.

141. The heart has four cavities—two auricles and two ventricles.

142. It is the centre of the circulatory system.

143. The arteries have much stouter walls.

144. The blood-wave.

145. In color and composition venous blood is darker and contains much carbonic acid, with other impurities from the body.

146. The valves of the veins open toward the heart, and are needed to prevent a back-flow.

147. The blood in the arteries is under greater pressure, and thus escapes more rapidly from a wounded artery than from a wounded vein.

148. It rises from the left ventricle above the heart, turns suddenly and passes down the centre of the body, sending off branches on either side.

149. By the lungs.

150. The blood enters the auricles, whose walls contract and force it into the ventricles, the walls of which contract and force it out into the circulation.

151. They are a fine network of blood-vessels which carry the blood to the surface of the body. Through their walls the material for building up the body passes, and through their walls are received the waste substances of the body.

152. All the blood passes through the whole circulation every two minutes.

153. They are affected by excitement, by violent exercise, stimulants, etc.

154. The blood flows from the heart in the arteries, and toward the heart in the veins.

155. Between the wound and the heart, if an artery be severed. On the opposite side of the wound, if a vein be severed.

156. The process of converting food into bone, tissue, etc.

157. By the blood.

158 It quickens the heart's action.

159. It changes the muscles of the heart to fat.

160. Alcohol increases the heart's action, causing an increased flow of blood.

161. Lightness, proper ventilation, and warmth.

162. The blood is freed of its impurities and supplied with oxygen.

163. The lungs.

164. The lungs are situated in the cavity of the chest. They are elastic and filled with a multitude of air cells.

165. The covering of the lungs.

166. The trachea is the tube by which air is conveyed to the lungs. The larynx is a box-shaped organ at the upper extremity of the trachea.

167. The bronchial tubes are the two divisions of the trachea which convey air to either lung.

168. To the air-cells.

169. They are hair-like projections, which by their waving motion expel dust from the air-passages.

170. The ribs and diaphragm must rise and fall.

171. It increases its action.

172. To keep foreign substances out of the air-passages.

173. The diaphragm is a membrane stretched across the body, separating the thoracic cavity from the abdominal. It assists in the process of breathing.

174. That oxygen may come in contact with the blood.

175. Oxygen, nitrogen, carbonic acid, watery vapor, and a small portion of various other gases.

176. It has less oxygen and more carbonic-acid gas than ordinary air.

177. By breathing through a glass tube into a glass of lime-water carbonate of lime will be precipitated.

178. Carbonic-acid gas destroys life by excluding oxygen.

179. In breathing upon a cold, polished surface, the water-vapor from the lungs will condense.

180. It is changed by giving up carbonic acid and receiving oxygen.

181. They will finally be absorbed.

182. Consumption ; pneumonia.

183. Headache, lassitude, lung trouble, and general derangement of the body.

184. About 98°.

185. It does not.

186. The functions which the vegetable and animal have in common, as circulation, digestion, respiration.

187. To convey sensation.

188. The white and the gray matter; the gray is the more abundant.

189. In the brain the gray matter is upon the surface, and the white matter is deep-seated. In the spinal cord the opposite is the case.

190. Minute divisions of the nerves ; nerves are thread-like bodies which convey sensation. The neurilemma is the covering of the nerves.

191. To transmit nervous force and impressions.

192. The gray matter is chiefly composed of cells. A ganglion is a collection of gray cellular matter, and is the seat of reflex action.

193. The cerebrum, the cerebellum, and the medulla oblongata.

194. They are divided into two parts.

195. The outer membrane or *dura mater* is thick and very resisting; the *arachnoid* is a closed sac of serous membrane which secretes an albuminous lubricating fluid ; the *pia mater* is a fine network of blood vessels.

196. The cerebrum occupies the upper portion of the brain. It is deeply convoluted and divided into two parts.

197. Intelligence.

198. They are a single organ as far as the intellect is concerned, but double with relation to the two sides of the body.

199. The cerebrum is the seat of the higher faculties.

200. The spinal cord is a bundle of nerve-fibres called *afferent* and *efferent* nerves. Gray matter is also present in the spinal cord.

201. The afferent nerves convey sensation, and the efferent nerves convey motor impulses.

202. Thirty-three pairs of nerves that branch from the spinal column.

203. The posterior roots.

204. The anterior roots.

205. Sensation and motor influence may be communicated to them.

206. The nerves extending from the brain to the various parts of the head. They number twelve pairs.

207. An impulse along an afferent nerve to a nerve-centre, and an impulse from the nerve-centre along an efferent nerve without consciousness on the part of the brain ; as, when the hand touches a hot iron, the hand is drawn away before the sensation of pain is felt. The nerve-centre in this case is the spinal cord. Nerve-centres, or ganglia, are necessary for its performance.

208. After their occurrence.

209. Alcohol causes an increased amount of blood to flow to the brain. The brain substance becomes harder and shrunken, and a watery fluid fills the cavities. The blood-vessels are frequently weakened and burst, causing paralysis.

210. Alcohol impairs the will.

ANSWERS TO PHYSIOLOGY, FIRST GRADE.

1. So that it may act as a spring when the body receives a jar.

2. The shoulder-joint. Because of the shallowness of the cavity into which the joint fits.

3. By ligaments.

4. The cavity of the chest.

5. Small openings, or ducts, in the bones.

6. A point about which bone-substance gathers.

7. Because of the absence of pressure during the night upon the cartilaginous substance between the bones of the spinal column.

8. For the attachment of ligaments and muscles.

9. By a prolongation of the processes of the spinal column.

10. So that when raised in the act of inspiration the cavity of the chest will be enlarged.

11. About the twentieth year of life.

12. Injuries in youth, such as falls, blows, etc. Unnatural positions, long-continued weakness of the muscles of the back, etc.

13. A fibre is a thread-like substance, usually found in bundles. A tissue is one of the constituent parts of a body.

14. They are bundles of muscle fibres.

15. White fibrous tissue connected with muscle-substance.

16. They are ring-like muscles encircling apertures.

17. The rebuilding of destroyed muscular substance, and a general repair of the waste caused by labor.

18. A general breaking-down of tissue.

19. It is the tendon passing over the heel, and receives its name from being the vulnerable spot in the warrior Achilles.

20. Raising weights with the arms brings into use the biceps muscles. Pushing against a wall or upright bars exercises the triceps muscles. Bending forward till the hands touch the feet exercises the muscles of the back. Rising upon tiptoe and raising the body from a sitting position calls into action the muscles of the legs. Lying upon the back and raising the body to a sitting position, without the use of the hands, exercises the abdominal muscles. Raising dumb-bells pependicularly above the head from the shoulder develops the muscles of the chest.

21. The will, mechanical agents, chemical agents, and electricity.

22. The papillæ are elevations upon the tongue possessing nerves which carry to the brain the sensation of taste.

23. One in whom the dark pigment-cells are wanting.

24. The skin is one of the sources by which the waste matter is thrown off from the body. Unless it is kept clean, that its pores may be open, it will not perform this office, and greater labor is then thrown upon the lungs and kidneys, to the detriment of these organs.

25. Seventy per cent.

26. Animal parasites in meat. To guard against them meat should be thoroughly cooked.

27. A wasting of the substance of the body, notably the lungs.

28. Corn has more fat, but less nitrogenous matter, than wheat or rye.

29. Brandy, rum, whisky, and gin contain about fifty per cent of alcohol; wine, from five to twenty-five per cent.

30. Beer, ale, and porter contain from three to eight per cent of alcohol.

31. It is not.

32. The active principle of tea is tannin; of coffee, caffein.

33. The *parotid*, in front of the ear. The *submaxillary* and the

sublingual, between the lower jaw and the floor of the mouth, the submaxillary being farther back than the sublingual.

34. By the contraction of the muscular walls of the œsophagus.

35. Because the mouth, by being open, becomes drier than usual.

36. By means of an opening made by a gun-shot wound in the wall of the stomach of Alexis St. Martin, a Canadian voyageur.

37. The lining membrane of the abdomen is the peritoneum.

38. In the mouth it meets the saliva, where some of the starch is changed to sugar. It thence passes through the œsophagus to the stomach, in which it meets the gastric juice, which changes the fats. It passes out into the small intestine, and there meets the bile and pancreatic juice, which changes the starch to sugar.

39. It is partly absorbed by small blood-vessels opening into the stomach.

40. The demand of the system for a fluid to convey nutrition and carry away waste matter.

41. The intestines.

42. The covering of the heart.

43. By Harvey in 1616.

44. Upon the right side of the neck.

45. It is transmitted by the left ventricle.

46. By its contraction.

47. To carry oxygen to the different parts of the body and bring back to the lungs carbonic-acid gas.

48. Coagulation is due to the fibrin. By coagulation excessive bleeding from a slight wound is avoided.

49. Bleeding from ruptured blood-vessels.

50. The lacteals.

51. By the vibration of the vocal chords. Its modifications depend upon the contraction of these chords.

52. Because, if fastened, they could not be fully inflated.

53. A considerable length of time elapses before all the air in the lungs is changed.

54. The lungs would be overworked and so injured.

55. By the thin walls of the blood-vessels and the air-cells.

56. In the pulmonary capillaries the blood gives up carbonic-acid gas and receives oxygen. In the nutritive capillaries it exchanges food for worn-out material.

57. By the epiglottis.

58. It is maintained by the chemical action which takes place in the digestion of food, and the action of oxygen in uniting with the carbon of the tissues.

59. It serves simply to dilute the oxygen.

60. Anatomy is the study of the structure of the body. Physiology is a study of the bodily functions. Hygiene is the study of the best ways of using the bodily powers and ministering to their wants.

61. Œsophagus, trachea, patella; colon, cæcum, and rectum comprise the large intestine; duodenum, jejunum, and ileum comprise the small intestine; scapula, clavicle, sternum.

62. In the brain.

63. Organic bodies have the power of growth and reproduction. Inorganic bodies do not.

64. Because the odor of the medicine does not strike upon the olfactory nerves. We receive many impressions through the sense of smell which we ascribe to taste.

65. Impure blood is conveyed by an artery from the heart to the lungs.

66. Man stands erect, and has hands suited for design.

67. A deranged condition of the nervous system, and a weakened condition of the heart, which may end in disease of that organ.

68. It injures the senses of smell and taste, and the quality of the voice.

69. Cigarettes are more largely adulterated than tobacco in other forms, and the one who uses them takes a large amount of smoke into his lungs.

70. Digestion, circulation, and respiration; because these are common to vegetables as well as to animals.

CHAPTER VII.

ALCOHOL AND ITS EFFECTS UPON THE BODY.

For Second Grade.

1. What is alcohol ?

2. Name the common alcoholic drinks, and state the percentage of alcohol in each.

3. What is meant by a "fortified" or "brandied" wine ?

4. Name other substances found in alcoholic drinks.

5. Is alcohol a food ?

6. What effect has alcohol upon the stomach ?

7. How does alcohol find its way over the system ?

8. What percentage of the blood is water? and what effect has alcohol upon this ?

9. Of what use are the red blood corpuscles? and what is the action of alcohol upon these ?

10. How is the circulation affected by the shrunken and irregular shape of the red corpuscles ?

11. What proof is there that the presence of alcohol in the blood prevents its complete purification ?

12. What proportion of the blood is fibrine? and how is this affected by alcohol ?

13. What organs of the body have the greatest attraction for alcohol ? Which of these has the greatest ?

14. State, in general, the effect of alcohol upon the liver.

15. What proportion of alcohol in the blood has been found to check the absorption of oxygen?

16. State the temperature of the body. Tell how this is principally caused, and how alcohol affects the temperature.

17. How long is required for the body to regain its normal temperature after the temperature has fallen from the use of alcohol?

18. Why do men, after taking alcohol, feel the cold so much more intensely when exposed to it?

19. During what season are the worst influences of alcohol on man observable?

20. What is a true fuel food? and why is alcohol not one?

21. What vital organ is first to fail in power after indulgence in strong drink?

22. What is the effect of alcohol upon the heart?

23. It has been estimated that the heart makes 100,000 beats in twenty-four hours. How would these be increased in that time by the taking of four fluid ounces of alcohol?

24. As alcohol is not digested by the stomach, but passes unchanged into the blood, how is it carried out of the system?

25. How are the kidneys affected by alcohol?

26. What fatal disease often results from long-continued use of alcoholic drinks?

27. What fatal diseases of the brain and nervous system are induced by alcohol?

28. Is alcohol a narcotic?

ANSWERS TO ALCOHOL AND ITS EFFECTS UPON THE BODY, SECOND GRADE.

1. Alcohol, or spirit of wine, so called because first distilled from wine, is a colorless liquid, lighter than water, and boils at 172° Fahr. It is combustible, burning with an almost colorless flame, and yielding considerable heat. It has a pungent odor, and, when in contact with the lips, tongue, or throat, produces a sharp, burning taste. Its chemical composition (ethylic alcohol) is represented by the formula C_2H_6O. It forms the active part of intoxicating drinks, and its nature is not changed by anything with which it is mixed.

2. By volume, brandy, from 50 to 54 per cent; rum, 48 per cent; whiskey, 45 to 46 per cent; gin, 38 to 39 per cent; sherry wine, 22 to 23 per cent; Madeira, 20 to 24 per cent; port, at least 20 per cent; champagne, 10 to 11 per cent; ales and porters, often as high as 10 per cent; beer varies from 4 or 5 to 12 per cent; cider has nearly the same amount of alcohol as beer.

3. When wines, after the actual process of fermenting, are found to contain too small a percentage of alcohol, some strong spirit, as brandy, is added to increase the percentage of alcohol. The percentage is thus increased from 3 to 5 per cent.

4. All contain water, and more or less sugar, and a small amount of free acid. In wines, there is from 3 to 5 per cent of sugar. Beers and ales contain, in addition to sugar, certain extractive substances.

5. Foods have been defined as substances, which, when taken into the alimentary canal, are absorbed from it and serve either to supply material for the growth of the body or for the replacement of matter which has been removed from it. A food, therefore, must contain the elements which it is to replace in the body. In addition, it must be capable of being absorbed by the stomach and intestines, and carried to all the tissues of the body to build them up or replace them, and it must not injure the structure or function of any organ. Alcohol does not supply water, it does not supply the salts from which bone is made, it does not supply albumen, caseine, fibrine, or any of those substances which build up the muscles, nerves, and other active organs; and it is directly injurious to these, as will be seen by the answers to other questions.

6. The effect of alcohol upon the stomach is less injurious than upon any other organ. When first taken, it produces a sense of warmth in the stomach, due to the relaxation and enlargement of the blood-vessels and the forcing of more blood into them. This state of irritation often increases the appetite and causes more

food to be taken; but its digestion is impaired, because of the action of the alcohol upon the gastric juice. When the use of alcohol is continued, the vessels become permanently dilated, the coat becomes thickened, and not only is the secretion of the gastric juice largely diminished, but it becomes coagulated or thickened and its power of digestion greatly lessened.

7. By whatever way alcohol is introduced into the body, it is very soon absorbed into the blood, and carried by the blood all over the body.

8. There is 79 per cent of water in the blood; and alcohol, because of its affinity for water, lessens this amount, and thus impairs the power of the blood to build up tissue.

9. A great part of the carbonic acid gas given out with the breath is condensed in the red corpuscles, and brought to the lungs in the circulation of the blood. Coming into peculiar contact with the air in the lungs, these corpuscles give up their carbonic acid gas, and become charged with oxygen. The blood is thus oxygenated or purified—changed from a dark red to a bright red color. The red corpuscles, when alcohol is present in the blood, lose part of their power to absorb oxygen, and they undergo, besides, a process of shrinking, due to the extraction of water from them.

10. Owing to their smaller and irregular form from loss of water, the corpuscles adhere together in masses, and become directly obstructive to the course of blood in the minute vessels of the body, producing, too, congestion of the blood in these parts, and at length leading to disease of the parts.

11. It is proved by the smaller amount of carbonic acid gas given off in the breath, and by the often-noticed blueness of the skin caused by the darker or unpurified blood in the vessels.

12. The proportion of fibrine is about two and a half parts in a thousand. An excess of alcohol in the blood coagulates the fibrine; and this, in its solidified state, retards the circulation of the blood, especially in the minute blood-vessels. Frequently, these tiny clots of fibrine obstruct the current of blood in the brain, and thus produce the beginnings of paralysis. In other instances, these obstructions occur in the liver or the kidneys, making these organs the seat of fatal diseases.

13. The liver and the brain. The brain, doubtless because it contains more water in its structure than any other organ.

14. At first, alcohol irritates the liver in much the same way it does the mouth and tongue; then distention of the blood-vessels takes place, and there is a larger accumulation of blood in them than there should be. This change in condition causes a change in its action, and impairs its power of making the food carried to it ready for the uses of the body, its power of secreting bile, and its power of changing waste matter so that it can be carried out of the system by other organs. Its more serious effect, resulting form beer and wine drinking, is fatty degeneration of the liver.

15. One part of alcohol in five hundred has been proved by experiment to check the perfect reception of oxygen by the blood.

16. The temperature of the body is a little over 98° Fahr. This temperature is caused principally by the union of oxygen with carbon and hydrogen in the lungs. When just sufficient alcohol is taken to produce a decided effect upon the body, the temperature of the body is apparently raised. In those not accustomed to alcohol, the temperature is raised half a degree, while, in those who are accustomed to it, the temperature may be raised from a degree to a degree and a half. This is due to the fact that the alcohol, conveyed to all parts of the body, has reduced the nervous power of the small vessels spread through the whole surface of the skin, and rendered them, because of their weakened state, unable to resist the force of blood from the beat of the heart. There is now an excess of warm blood in the skin, and a sense of increased warmth is felt; but the surface is giving off more heat than is natural, and at the expense of the body, which is making heat by the ordinary chemical changes. As the alcohol itself does not produce any heat, the result is that the temperature of the body falls from one to two degrees, according to the temperature of the surrounding air. This is accompanied by depression and chilliness, and there is great liability to take cold.

17. Under the most favorable conditions, two hours; under conditions less favorable, three hours are required.

18. The alcohol causes the blood to flow to the surface of the body, where its heat is rapidly set free. As alcohol furnishes nothing to keep up the supply of heat, the vital energy is lessened and the cold becomes painful.

19. During the winter, and particularly when the weather is intensely cold. For as alcohol checks the production of animal heat, the cold is given more chance to attack the body.

20. A true fuel food is one capable of producing and sustaining animal warmth. As alcohol produces a contrary effect, lowering the temperature of the body and impairing its power to resist cold, it is not a true fuel food.

21. The heart.

22. The frequency of the heart's action is increased, but not its force, and there is, consequently, an abatement of its force much earlier in life. It is also rendered more liable to become obstructed by fat, and to undergo change of structure.

23. Four fluid ounces of alcohol taken in twenty-four hours increases the beats to 112,226, or nearly 8½ beats a minute beyond the natural number.

24. Partly by the lungs and skin, but principally by the kidneys.

25. It is the office of the kidneys to carry out of the system, to a large extent, materials in the blood that are not changed in their nature or appropriated by the system to build it up. As alcohol passes from the stomach into the blood, its first action upon the kidneys is to produce irritation, as it does upon the stomach and

liver. The blood-vessels, which serve so important a part in the delicate work done by the kidneys, are distended, and become more or less congested, according to the amount of alcohol passing through them. Their secretions are unnaturally increased, and their structure begins to break down, followed directly by disease in some part of the system.

26. Bright's disease. Though not solely caused by alcoholic beverages, yet the long use of them causes the greatest number of cases of this disease.

27. Apoplexy, epilepsy, paralysis, vertigo, softening of the brain, and dementia or general failure of the mental powers.

28. Alcohol is called a powerful narcotic, because it has all the properties characteristic of that class.

CHAPTER VIII.

BOOKKEEPING.

For Second Grade.

1. What is a business transaction?
2. Define debtor; creditor.
3. Define debits; credits.
4. What is an account?
5. Define bookkeeping.
6. How many methods are there in bookkeeping, and how are these distinguished?
7. What are the three main books of single entry?
8. Define each.
9. Name three auxiliary books that may be used in the same system.
10. Define each.
11. Write a receipt.
12. Make out a bill of items, and receipt it.
13. What are resources?
14. By what other name are they sometimes designated?
15. What are liabilities?
16. What is an inventory?
17. What is meant by insolvency?
18. Define posting.
19. What is meant in posting by "short extended" and "full extended"?
20. Explain these signs: @, %, Mdse., Dr., Int., Dis., Cr.

21. What is meant by condensed accounts?

22. Into what two main classes are accounts divided?

23. What is a trial-balance?

24. What is meant by the term merchandise?

25. What does the difference between the debtor and creditor sides of the cash-book indicate?

26. What does the difference between the debtor and creditor sides of a personal account show?

27. What is a due-bill?

28. On which side of the cash account does the balance occur, and why.

29. What do we mean by "closing the ledger"?

30. How may the correctness of the posting be determined?

31. With what is Bills Payable debited?

32. What is a balance-sheet?

33. Rule paper for a day-book, a cash-book, a ledger, condensed accounts. Enter the following items appropriately, and balance cash-book and ledger:

June 1, 1885—Amt. on hand this day $104.50.

" 2. Paid Stephen Wood for coal $5.59.

" 3. Sold John Tooker on $^{a}/_{c}$ 10 lb. sugar @ 8c., 2 lb. coffee @ 24c., 1 lb. starch 9c.

" 4. Sold Wm. S. Greene on $^{a}/_{c}$, 1 lb. tea 75c., 25 lb. flour @ 3c.

" 5. Paid gas-bill $3.80. Paid water-bill $2.70.

" 6. Sold Stephen Wood on $^{a}/_{c}$ 4 gal. molasses @ 60c., 1 lb. rice 10c.

" 7. Rec'd cash for sales this week $97.60.

" 10. Sold Wm. S. Greene on $^{a}/_{c}$, 1 can corn 20c., 2 cans pears @ 18c.

" 17. Sold John Tooker on $^{a}/_{c}$ 1 lb. flour $6.75, 1 bag feed $1.09

" 21. Rec'd for sales this week $60.27.

" 26. John Tooker has paid $5 on $^{a}/_{c}$.

June 27. Paid tax $16.20. Paid clerk $10. Paid carting $2.50.

" 27. Rec'd for sales this week $59.67.

" 30. Sold Wm. S. Greene on ⅜ old box-wagon for $12.

" " John Tooker has paid on ⅜ $4.12.

" " Paid rent for month of June $5.50.

" " Paid insurance $5.40.

" " Stephen Wood has brought me one cord of oak wood, for which he charges $4.80.

For First Grade.

1. What are the three main books of double entry?

2. Explain the relation which the second of these bears to the first and third.

3. Name three auxiliary books.

4. What is a bills-payable account? What, a bills-receivable account?

5. In what books are they entered, and what particulars are stated about them?

6. What is journalizing?

7. How would you balance an account in the ledger?

8. What are accommodation accounts?

9. What is meant by closing an account?

10. Suppose a transaction has been incorrectly journalized and posted in the ledger, how would you correct the error?

11. What are accounts current?

12. New York, July 1, 1885. Bo't of C. E. Harriots 1500 bbl. flour @ $5.85, and on July 2 sold John Claxton 320 bbl. @ $6.00. Make proper entries of the above items in day-book, journal, and ledger.

13. When money is received for interest, what is made debtor and what creditor?

14. Bo't of Baker & Pratt on our acceptance at 60 days, favor of H. E. Plympton, 400 triumph desks @ $4.75 = $1900.

What does the above transaction mean? Prepare it to enter in the ledger.

15. Write a draft, and accept it.

16. Write a note, and indorse it.

17. Under what class of accounts would you regard real estate, and why?

18. In closing your accounts, why does Merchandise appear in Balance account and also in Loss and Gain?

19. Journalize the following transaction: Bo't of Wayland Smith an invoice of mdse. amounting to $480. Paid one half in cash and gave my note for the balance.

20. When will Mdse. account indicate a loss?

21. In the closing of the ledger, into what account do you close loss and gain?

ANSWERS TO BOOKKEEPING, SECOND GRADE.

1. An exchange of values is a business transaction.

2. One who receives value on a promise to pay is a debtor. A person to whom a debt is owed is a creditor.

3. Debits are entries against debtors. Credits are entries in favor of creditors.

4. A record of a business transaction, under its proper title, is an account.

5. Bookkeeping is the process of recording business transactions.

6. There are two ways by which books are kept,—by single and by double entry. In single entry the record of the transaction is entered in but one place; in double entry, in two or more places.

7. Day-book, ledger, and cash-book.

8. In the day-book each transaction is recorded as it occurs. In the ledger each man's debits and credits are brought together and placed on the proper side of his account. In the cash-book is placed, in the proper column, the record of all moneys received or paid out.

9. Bill-book, sales-book, invoice-book.

10. A book in which a record of notes is kept,—bills payable and receivable,—with the proper dates, is a bill-book. A book in which a record of merchandise sold is kept is called a sales-book. A book in which is kept an account of all merchandise on hand at the commencement of business, together with that bought, is an invoice-book.

11.

$\$165\frac{00}{100}$. MILWAUKEE, WIS., *Jan.* 4, 1885.

Rec'd of J. R. Trask one hundred sixty-five dollars, on account.
S. L. PIERCE.

12.

ROCHESTER, N. Y., *Jan.* 4, 1885.

Mr. A. R. Goodenow, *Dr.*,
To Howard & Co.

1883.				
Dec.	1	To 22½ lbs. nails, @ 4c.,		90
		" 1 lamp,	$2	60
		" 3 doz. screws, @ 8c.,		24
			$3	74

Rec'd pay't,
HOWARD & CO.

13. Money or property possessed, notes due, balances of account due, are resources.

14. Assets.

15. Money which one owes.

16. An account of stock on hand.

17. Inability to pay one's debts.

18. Transferring accounts from the day-book or journal to the ledger is *posting.*

19. When there are two or more items of the same day, dropping the amount of each before the double line and entering the sum of the amounts in the money columns is *short extended;* carrying the amounts directly to the money columns is *full extended.*

20. At, Account, Merchandise, Debtor, Interest, Discount, Creditor.

21. Entering debits and credits on same page and carrying the amounts to the proper money columns.

22. Into real and fictitious.

23. A statement of the total debits and credits of the several accounts is a trial-balance.

24. It is a general name given to goods, wares, commodities, or whatever is bought or sold in trade or in the market.

25. The amount of cash on hand.

26. An individual's indebtedness to the firm, or the firm's indebtedness to the individual.

27. A simple acknowledgment of a debt in writing is a due-bill.

28. On the credit side, because the firm cannot pay out more money than it receives.

29. Balancing all the accounts.

30. The total debits of the day-book will equal the total debits of the ledger, and the total credits of the day-book the total credits of the ledger. Their differences will also be equal. This proof is not, however, a conclusive one, as two errors may balance each other, or the same transaction may be posted twice.

31. With the firm's own notes and acceptances as it redeems them.

32. A statement of the resources, liabilities, gains, losses, and present worth is a balance-sheet.

COLORA, MD., JUNE 1, 1885.

3	1	JOHN TOOKER,	*Dr.*		
		To 10 lbs. sugar, @ 8c.,	.80		
		2 lbs. coffee, @ 24c.,	.48		
		1 lb. starch,	.09	$1	37
4	1	WM. S. GREENE,	*Dr.*		
		To 1 lb. tea,	.75		
		25 lbs. flour, @ 3c.,	.75	1	50
6	1	STEPHEN WOOD,	*Dr.*		
		To 4 gallons mol , @ 60c.,	$2.40		
		1 lb. rice.	.10	2	50
10	1	WM. GREENE,	*Dr.*		
		To 1 can corn,	.20		
		2 cans pears, @ 18c.,	.36		56
17	1	JOHN TOOKER,	*Dr.*		
		To 1 bbl. flour,	$6.75		
		1 bag feed,	1.09	7	84
26	1	JOHN TOOKER,	*Cr.*		
		By cash on $^{a}/_{c}$,		5	00
30	1	WM. GREENE,	*Dr.*		
		To box-wagon,		12	00
30	1	JOHN TOOKER,	*Cr.*		
		By cash on $^{a}/_{c}$,		4	12
30	1	STEPHEN WOOD,	*Cr.*		
		By 1 cord of wood,		4	80

CASH.

			Dr.		*Cr.*	
1885.						
June	1	To amount on hand,	$104	50		
	2	Paid Stephen Wood, coal,			$5	59
	5	Paid gas-bill,			3	80
		Paid water-bill,			2	70
	7	Rec'd for sales this week,	97	60		
	21	Rec'd for sales this week,	60	27		
	26	Rec'd of John Tooker on $^{a}/_{c}$,	5	00		
	27	Paid tax,			16	20
		Paid clerk,			10	00
		Paid carting,			2	50
		Rec'd for sales this week,	59	67		
	30	Rec'd of John Tooker on $^{a}/_{c}$,	4	12		
		Paid rent for month,			5	50
		Paid insurance,			5	40
		By balance,			279	47
			$331	16	$331	16

Dr. JOHN TOOKER. *Cr.*

1885.										
June 3	To mdse.,	1	$1	37	June 26	By cash,	1	$5	00
17	" "	1	7	84	30	" "	1	4	12
						" balance,			09
			$9	21				$9	21
July 1	To balance,			09					

WM. S. GREENE.

1885.									
June 4	To mdse.,	1	$1	50	June 30	By balance,		$14	10
10	" "	1		60					
30	" "		12	00					
								$14	10
			$14	10					
July 1	To balance,		$14	10					

STEPHEN WOOD.

1885.					1885.				
June 6	To mdse.,	1	$2	50	June 30	By 1 cord wood	1	$4	80
30	" balance,		2	30					
			$4	80				$4	80
						By balance,		$2	30

ANSWERS TO BOOKKEEPING, FIRST GRADE.

1. Day-book, journal, ledger.

2. Proper debits and credits are deduced from the original entries in the day-book and recorded in the journal, from which they are collected and posted to the several individual accounts in the ledger.

3. Cash-book, invoice and bill books.

4. An account of notes and bills issued to other parties by the firm is a bills-payable account. An account of notes and bills due the firm is a bills-receivable account.

5. In the bill-book. In this is kept a record of the date of issuance, date of maturity, when paid or otherwise disposed of.

6. Determining the proper debits and credits from every transaction recorded in the day-book and entering these as such in the journal.

7. Add each side. If these are not equal, place on the smaller side, in red ink, the amount necessary to make them equal, either as "To balance" or "By balance." On the opposite side, below the double balance-line, enter it in black ink as "By balance" or "To balance."

8. Accounts not essential but convenient, such as real-estate accounts, sundry-items account, bills-receivable accounts, etc.

9. Closing an account supposes a settlement which makes the debit and credit sides equal. Double lines are drawn under the equal totals.

10. Enter an equal amount on the opposite side, as "By error" or "To error" as the case may be.

11. Bills of account, containing all the debits and credits, are accounts current.

12.

DAY-BOOK.

New York, July 1, 1885.

Journal page.	Bo't of C. E. Harriots, on $^{3}/_{c}$, 1500 bbls. flour, @ $5.85,	$8775	00
	2		
	Sold John Claxton, on $^{3}/_{c}$, 320 bbls. flour, @ $6.00,	$1980	00

JOURNAL.

New York, July 1, 1885.

		Dr.		Cr.	
Ledger page.	Merchandise To C. E. Harriots,	$8775	00	$8775	00
	2				
	John Claxton, To Mdse.,	$1980	00	$1980	00

LEDGER.

Dr. Merchandise. *Cr.*

1885. July	1	To C. E. Hariots	*Journal page.*	$8775	00	1885. July	2	By Jno. Claxton	*Journal page.*	$1980	00

Dr C. E. Harriots. *Cr.*

						1885. July	1	By Mdse.,		$8775	00

Dr.		JOHN CLAXTON.								*Cr.*
1885. July	2	To Mdse.,		$1980	00					

13. Cash is made debtor and interest creditor.

14. Baker, Pratt & Co. have taken our draft on H. E. Plympton, at 60 days. In the ledger the entry would be, "Merchandise Dr. To Bills Payable, $1900.00." The other entry would be, "Bills Payable Cr. By Mdse, $1900.00."

15.

$20. BANGOR, ME., *July* 1, 1885.

At sight pay to Charles Gordon, or bearer, twenty dollars, value received, and charge to our account. T. S. GRACE & CO.

To O. R. THOMES,
Somerville, Me.

To accept the above draft the drawee writes the word "Accepted" with his name and the date across the face.

16.

$92 $\frac{50}{100}$. DETROIT, MICH., *Sept.* 2, 1885.

On demand I promise to pay B. C. Thwyng, or order, ninety-two dollars and fifty cents, value received. A. T. COTTON.

The above note would be indorsed by the payee writing his name on the back.

17. Accommodation accounts, because they are convenient but not essential accounts.

18. It appears in Loss and Gain because money has been paid for it and Mdse. has not realized it. It appears in Balance account because it is one of the resources, and the Balance account shows total resources and liabilities.

19.

		Dr.		*Cr.*	
Ledger page.	Merchandise To Bills Payable,	$240	00	$240	00
	Merchandise To Cash,	240	00	240	00

20. When we have bought more merchandise than we have sold.

21. Close Loss and Gain account into the proprietor's account.

CHAPTER IX.

CIVIL GOVERNMENT.

For Second Grade.

1. What is a State?
2. What is government? What is civil government?
3. Distinguish between the government and the State.
4. Name and define three forms of government. Give an example of each.
5. What three departments has government?
6. What is law?
7. Distinguish between statute law and unwritten or common law.
8. What is a constitution?
9. State the three obligations of government.
10. How may each of these obligations be secured?
11. What are the four natural rights? Why are they so called?
12. What is the writ of *habeas corpus,* and what natural right is it intended to secure?
13. What is the meaning of the words *habeas corpus?*
14. Upon what principle is the right of taxation based?
15. Why is it necessary to tax?
16. What is the right of eminent domain?
17. What is civil liberty?
18. Name the conditions under which one should forfeit his natural rights.
19. How may a government promote the general welfare?

20. What is the duty of government in the matter of education?

21. What are the reasons for the necessity of education in republics?

22. What is the duty of the government in regard to the defence of the State?

23. What obligation is a government under towards other States?

24. What is international law?

25. Wherein does it differ from other law?

26. Into what two classes are the inhabitants of a State divided? Define each class.

27. What duties have citizens toward the government?

28. What is the right of suffrage?

29. Is it a natural or a civil right?

30. Why is it every voter's duty to vote?

31. When is revolution toward a government justifiable?

32. What are political rights? What civil rights?

33. To which of these classes does the right of religious belief or worship belong?

ORIGIN OF THE CONSTITUTION

34. Between the adoption of the Declaration of Independence and the Articles of Confederation (1776–1781), how was the government of the colonies exercised?

35. What were the Articles of Confederation?

36. Name four defects of the Articles of Confederation which led to the adoption of the constitution?

37. What is the object of the constitution?

HOUSE OF REPRESENTATIVES AND THE SENATE.

38. What is the number of members of the House of Representatives?

39. How are they chosen? For how long elected?

40. What qualifications are requisite?

41. What salary do the members receive?

42. State what representation the Territories have in Congress.

43. In case of vacancy, how is the representation of a State filled?

44. State the plan of apportionment.

45. How is the House of Representatives organized?

46. What two special powers has the House of Representatives?

47. What determines the number of senators?

48. What qualifications are requisite for a senator?

49. What salary do senators receive?

50. How are senators chosen, and for how long?

51. How is a vacancy in the office of senator filled?

52. How is the Senate organized?

53. What special powers has the Senate?

54. State how a bill originating in either house may, under veto, become a law.

55. In either house, how many constitute a quorum?

56. Explain how a bill may become a law.

57. Give the number of the present Congress, and state how it is determined.

58. When does Congress convene?

59. How is Congress adjourned?

60. What prohibitions are put upon members of Congress?

61. What compensation, other than salary, do members of Congress receive?

62. How is the Senate made a perpetual body?

63. What is meant when it is said that the House of Representatives embodies the national idea, and the Senate represents the federal idea?

THE PRESIDENT AND VICE-PRESIDENT.

64. What qualifications must the President of the U. S. have?

65. State the manner in which he is chosen.

66. State the number of electors, and how this number is determined.

67. In case no person has a majority of the electoral votes, how is the choice made?

68. In case the office of President becomes vacant, name the other officers that may become President.

69. Give the President's term of office and salary.

70. What is furnished him besides salary?

71. What limitation is put upon increasing his salary?

72. What are the general duties of the President?

73. Name the executive departments of the government.

74. How are the heads of the departments chosen?

75. What are the duties of the Vice-President?

76. What salary does he receive?

77 How is he elected?

78 When the Vice-President becomes President, how is the office of Vice-President filled?

JUDICIARY.

79. What is the highest court of the U. S.?

80. Who presides over this court, and how are these offices chosen?

81. What salary do they receive?

82. How long is the term of office?

83. On what day does the court annually convene?

84 Who is the present chief-justice?

85. What two courts just below the highest?

86 Who presides over these courts?

87 Name the courts below the circuit courts.

88. What officers have these courts?

89. What is the Court of Claims?

POWERS OF CONGRESS.

90. What power of taxation has Congress?

91. What is a tax? What are duties? Imposts? Excises?

92. Distinguish between *direct* and *indirect* taxes.

93. Define *specific* and *ad valorem* duties.

94. What power has Congress to borrow money?

95. What power over the revenue?

96. What control has Congress over the regulation of commerce, including the coining of money, weights and measures, and bankrupt laws?

97. State all the steps in the provision for naturalization established by Congress.

98. Under what power of Congress was the postal money-order system established?

98. What is a patent? What a copyright? For how long are these granted?

100. Define piracy and treason.

101. What power has Congress in such cases?

102. What power has Congress respecting war?

103. What power respecting the territory and all the property of the U. S.?

104. What are the modes of procedure for the admission of a State into the Union?

105. What does the Constitution say respecting *ex-post-facto* laws?

106. How may the Constitution be amended?

107. Give an outline of the "bill of rights" embodied in the first ten amendments to the Constitution.

108. Give an outline of the eleventh and twelfth amendments.

109. Give an outline of the thirteenth, fourteenth, and fifteenth amendments.

110. Give an account of the mode of impeachment, the officers impeachable, and how the trial is conducted.

For First Grade.

1. Who are excluded from being electors?

2. What was the original mode of electing the President and Vice-President?

3. What is meant in the Constitution by "but no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attainted"?

4. What is the introductory part of the Constitution called?

5. What reason can be given for the short term of office fixed for representatives?

6. What advantage is derived from dividing the legislative body into two branches?

7. Wherein does the Senate differ from the House of Representatives?

8. To what parts of the English Parliament do the Senate and House of Representatives correspond?

9. What reason can be assigned for each State, whether large or small, having two Senators?

10. From what does the Declaration of Independence say that governments derive their just powers?

11. Who presides in the Senate on trial of the President of the U. S.?

12. When is the presiding officer of the Senate entitled to vote?

13. How are the rules of proceeding in Congress determined?

14. How is the publicity of the doings of Congress secured?

15. How are fugitive criminals escaping into another State returned?

16. What is meant by the Civil Service of the U. S.?

17. What reason can be given for the long term of office fixed for senators?

18. In what way does the vote of the senators differ from the vote of the Continental Congress?

19. Into what classes are senators divided?

20. At what time does the Senate choose a president *pro tempore?*

21. In trials of impeachment, what reasons can you give why the verdict should not be unanimous as in trial by jury, and why, moreover, a bare majority should not be sufficient for conviction?

22. When there is not a quorum in either house of Congress, what power has that smaller number?

23. What does the word *veto* mean?

24. Why does the Constitution prohibit titles of nobility?

25. Assign reasons why the command of the army and navy is intrusted to the President rather than to Congress?

26. In what cases has the President no power of pardon?

27. What is meant, in speaking of courts, by *original* and *appellate* jurisdiction?

28. In what court can action against foreign ministers be commenced?

29. Can a person be tried a second time for the same offence?

30. What is a reprieve?

31. Can either house of Congress adjourn at pleasure?

32. What is the militia?

33. Over what district may Congress exercise exclusive legislation?

34. Why have citizens residing in the District of Columbia no right to vote there?

35. When can the writ of *habeas corpus* be suspended?

36. What is the President's message?

37. Can a person be compelled to be a witness against himself?

ANSWERS TO CIVIL GOVERNMENT, SECOND GRADE.

1. "A State is a community of persons living within certain limits of territory under a permanent organization which aims to secure the prevalence of justice by self-imposed laws."

2. Control and administration of law. "Civil government is control by law exercised by a State over its members."

3. The State is the whole body of organized people; the government is subordinate to the State, receiving its power from it and being responsible to it.

4. An absolute monarchy is a government in which the laws are made by one person and executed and interpreted by officers appointed by him.—A limited monarchy is one having a hereditary ruler as executive, a legislative department chosen by the people, and a judiciary responsible to the executive.—A republic is a government in which the laws are made, interpreted, and executed by representatives elected by the people.—Russia, England, United States.

5. Executive, legislative, and judicial.

6. Law is a rule of order established by the State.

7. Laws made by the legislature are statute laws.—All judicial decisions, or principles established by courts, are unwritten or common law.

8. A constitution is the fundamental law with which all other laws must accord.

9. To secure justice to the individual, to promote the general welfare, and to defend the State.

10. Justice to the individual may be secured by protecting him in the rights of personal security, personal liberty, the right to hold private property and the right of religious worship.—The general welfare is promoted by the right of taxation and the right of eminent domain. The defence of the State is secured by punishing any one who violates its laws.

11. Personal security, personal liberty, the right to hold private property, the right of religious belief.—Because they justly belong to each man by nature.

12. A written instrument issued by a judge or court ordering a sheriff or similar officer to produce the person in custody, in order that it may be determined whether the accused is under lawful arrest.—The right of personal liberty.

13. You may have the body.

14. The promotion of the general welfare.

15. To meet public expenses and for purposes of education.

16. A right by which the government by making a fair remuneration to the owner may compel the yielding of private property for public use.

17. Liberty under law.

18. Any violation of the law whereby the rights of another are infringed upon.

19. By securing justice, by executing measures of public utility, by fostering industries, and providing education.

20. It is bound to provide the rudiments of an education for all children, and compel them to attend school.

21. All the interests of the State are directly in the hands of the mass of people, and the better educated the people the better will be the government.

22. It should draw without limit upon the wealth and services of the people to defend the State.

23. It is bound to respect their rights.

24. The law which nations recognize in their intercourse with each other.

25. There is no umpire to settle disputes, and no penalty in case of its violation.

26. Citizens and aliens.—Citizens are those who were born in the State or who have become naturalized; aliens are persons residing in the country but not citizens.

27. It is the duty of each citizen to obey the laws of the government, and to defend the State when necessary.

28. The right to vote.

29. A civil right.

30. By voting he directs to the extent of his individual influence the administration of government.

31. When the government is injurious to the public welfare instead of beneficial, and when all other means of righting the grievances have failed.

32. The right to have a voice in the conduct of public affairs.—Civil rights are the enjoyments of one's natural rights subject to law.

33. Civil rights.

34. The affairs of the country were conducted by the Continental Congress, and the people relied upon the honor and wisdom of this body and acquiesced in its acts.

35. A written instrument adopted by Congress in 1777, by which the colonies styled themselves the United States of America, and declared themselves united for common defence, security of liberty, and mutual and general welfare. Each State was to retain its sovereignty, independence, and every power not expressly given to the United States Congress.

36. (1) It was a league of States and not a nation; (2) there was no power to enforce the enactments of Congress; (3) there was no power to levy and collect taxes · (4) there was no power to regulate commerce.

37. To form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defence, promote the general welfare, and secure the blessings of liberty to the people and their posterity.

38. 332. After March 3, 1893, there are to be 356 members.

39. The States are divided into congressional districts, in each of which the people elect one representative.—Two years.

40. A representative must be at least twenty-five years old, have been at least seven years a citizen of the United States, and when elected be an inhabitant of the State which elects him.

41. Five thousand dollars a year. The presiding officer receives eight thousand dollars.

42. Each Territory sends one person called a delegate, who sits with the representatives and takes part in discussions, but has no vote.

43. A vacancy is filled by a new election ordered by the governor.

44. The apportionment is made after each national census. The population of the United States is divided by the number of representatives which has been previously determined by Congress. This gives the number of inhabitants entitled to one representative. The population of each State is divided by this number, which gives the number of representatives to which the State is entitled. One additional representative is given to each of the States having the largest remainder, until the whole number is reached. Each State must have at least one representative.

45. The House elects one of its members as speaker. The clerk, chaplain, and other officers are not members.

46. The power to present articles of impeachment and the power to originate all bills for raising revenue.

47. The number of States—each State having two senators.

48. He must be at least thirty years old, have been at least nine years a citizen of the United States, and when elected must be an inhabitant of the State.

49. $5000.

50. They are chosen by the legislature of each State for a term of six years.

51. The appointment is filled in the usual way by the legislature. If the legislature is not in session the governor makes a temporary appointment till the legislature meets.

52. The Vice-President of the United States is the presiding officer. If he is absent, the Senate chooses a president *pro tempore*.

53. The power to try all impeachments. Appointments and re-

movals are made by the President with the consent of the Senate. It concurs in treaties made by the President.

54. It must pass each House by the approval of two thirds of its members.

55. A majority.

56. After passing both Houses it is sent to the President, who has ten days, Sundays excepted, to consider it. If he approves, he signs it. If he does not approve the bill, he usually returns it to the House in which it originated, with his reasons for not signing it. If he does not return it within the ten days, it becomes a law without his signature, unless Congress has adjourned before the ten days expire.

57. It is determined by the number of the representative term, dating from March 4, 1789, each term lasting two years.

58. The first Monday in December, unless otherwise appointed by law.

59. Both houses agree upon a day of adjournment, as neither house can adjourn for more than three days without the consent of the other.

60. They cannot hold any other civil office under the United States.

61. Mileage or compensation for traveling expenses.

62. One third of the senators go out of office every two years, and this secures to the public the benefit of two thirds of the members at all times.

63. In the House of Representatives the national idea, which was for diffusing power among the people, is embodied because its members are chosen directly by the people. The Senate represents the federal idea, which favored the concentration of power in the federal government, as its members are appointed by legislatures, each State being equally represented.

64. He must be a native citizen, have been a resident of the United States at least fourteen years, and be at least thirty-five years of age.

65. He is chosen by electors. These electors are chosen by the people of each State on the Tuesday after the first Monday in November, and the electors vote on the second Monday in January. They make three lists, each containing the names of the persons voted for, and the number of votes of each, which are signed by all the electors and sealed. A person is appointed to carry one list to the president of the Senate at the seat of national government, another is sent to the same person by mail, and the third is delivered to the judge of the United States court for the district in which the electors meet.

66. 444 (Jan. 1894). Each State is entitled to as many as it has members of Congress.

67. The House of Representatives proceeds to choose a President from the three persons having the highest number of electoral votes.

Two thirds of the States must be represented, the voting being by ballot and by States, each State having one vote. A majority of the States is necessary for election. If no choice is made by March 4th the Vice-President becomes President.

68. In case of removal by death or resignation or impeachment, the Vice-President becomes President. In case of the removal, death, resignation, or inability of both the President and Vice-President, the Secretary of State, if there be one, shall become President, and hold office during the remainder of the presidential term of four years; and in case there is no Secretary of State, or in case of his removal, death, resignation, or inability, then the Secretary of the Treasury, and next in order the Secretary of War, the Attorney-General, the Postmaster-General, the Secretary of the Navy, and the Secretary of the Interior.

69. Four years. Salary, $50,000.

70. The Executive Mansion with its furniture, fuel, lights, care of grounds, etc.

71. It cannot be increased during his term of office.

72. He is commander-in-chief of the military force of the United States; has power to grant reprieves and pardons for offences against the United States; with the consent of the Senate he makes treaties, appoints civil officers and the judges and officers of the United States courts; he transmits a message to Congress at the opening of each annual session, and sees that all laws are faithfully executed.

73. Department of State, of the Treasury, of War, of the Navy, of the Interior, of Justice, the Post-office Department, and the Department of Agriculture.

74. The appointment is made by the President with the consent of the Senate.

75. He is president of the Senate, but has no vote unless the Senate be equally divided. In case of vacancy in the office of President the Vice-President assumes the duties of President.

76. $8000.

77. By distinct ballot, in the same way and at the same time as the President.

78. The Senate elects a president *pro tempore.*

79. The Supreme Court.

80. One chief-justice and eight associate-justices.—They are appointed by the President with the consent of the Senate.

81. The chief-justice receives $10,500; the associate-justices, $10,000, per year.

82. For life or during good behavior.

83. The first Monday in December. 84. Melville W. Fuller.

85. There are nine Circuit Courts of Appeals, the United States being divided into nine judicial circuits. Next come the nine Circuit Courts.

86. A justice of the Supreme Court, assisted by a circuit justice.

87. The judicial circuits are divided into districts, in each of which is a district court.

88. The district court has a judge, a clerk, a marshal, and an attorney.

89. A court to try all claims against the government for the payment of money, and to make such awards as the court deems just.

90. Congress has power to lay and collect taxes, duties, imposts and excises, to pay the debts and provide for the common defence and general welfare of the United States.

91. A contribution imposed by the government on individuals for the service of the State.—Duties and imposts are taxes upon articles imported or exported.—Excises are taxes upon articles manufactured or produced for home consumption.

92. *Direct* taxes include poll-tax and tax on land, houses, and other real estate ; *indirect* taxes include duties, imposts, and excises.

93. *Specific* duties are proportioned to the quantity of the article imported ; *ad valorem* duties are proportioned to the market value of the article in the country which produces it.

94. It has power to borrow money on the credit of the United States.

95. The power to provide for a revenue and to control all expenditure of it.

96. It has entire control.

97. First, one must declare his intention to become a citizen of United States and make oath to the same before a circuit or a district court, or a State court having a seal. At least two years must pass before he can take the oath of allegiance,—that is, prove by witness upon oath that he has lived in the United States at least five years, and in the State in which he wishes to be naturalized at least one year ; that during the time his character and deportment have been good. He then makes a written declaration, supporting it by oath, that he renounces allegiance to all foreign powers and will support the Constitution of the United States.

98. Under the power of establishing "post-offices and post roads."

99. A patent is a written instrument securing to the inventor the exclusive right to manufacture and sell his invention. A copyright is exclusive privilege to print, publish, and sell copies of writings or drawings.—A patent is issued for seventeen years. A copyright is issued only to citizens or residents of the United States and for twenty-eight years, with the privilege of an extension of fourteen years.

100. Piracy is murder or robbery on the sea, or any offence which if committed on land would be punishable with death. Treason is levying war against the United States, or adhering to the enemies of the United States.

101. Congress has the power to declare the punishment for these.

102. Congress has power to declare war, grant letters of marque and reprisal, raise and support armies, establish armories and arsenals, military and naval academies, navy-yards, and to organize, train, and arm a militia.

103. The power to dispose of and make all needful rules and regulations respecting it.

104. The people form a State constitution and submit it to Congress with a petition for admission, or Congress passes an enabling act allowing the people to form a constitution and authorizing the President to issue a proclamation recognizing the new State.

105. No *ex-post-facto* law shall be passed.

106. In two ways: first, by Congress, two thirds of both houses agreeing; second, by a convention called by Congress upon application of the legislatures of two thirds of the States.

107. It guarantees religious freedom, freedom of speech and of the press, the right of assembly and petition, the right to keep and bear arms, exemption from quartering soldiers, security from unlawful search and seizure, prompt and impartial justice and trial by jury, exemption from excessive bail and from cruel and unusual punishments.

108. The 11th relates to the judicial power of the United States. The 12th prescribes the manner of electing the President and Vice-President.

109. The 13th abolished and prohibited slavery. The 14th guaranteed political and civil rights to all citizens; changed the rule of apportionment of representatives and direct taxes, to adapt it to a wholly free population; excluded from any office under the United State and in the States those rebels who had violated their oath of allegiance, unless Congress by a two-thirds vote removed this disability; established the validity of the public debt of the United States; forbade the payment of any debt incurred in aid of rebellion, or any claim for emancipated slaves; and gave to Congress power to enforce these provisions by legislation. The 15th gave the right of suffrage to the freedmen.

110. The President, Vice-President, and all civil officers of the United States may be impeached. Articles of impeachment are prepared by the House of Representatives and delivered to the Senate, and a committee is selected from the House to conduct the prosecution. The Senate conducts the trial. After the evidence is heard, and the arguments are made, each senator must answer "Guilty" or "Not guilty" to each of the articles. A two-thirds vote is necessary to conviction.

ANSWERS TO CIVIL GOVERNMENT, FIRST GRADE.

1. Senators, representatives, and all persons holding any office of trust or profit under the United States.

2. The electors voted for the two persons without specifying the

office, and the one who received the majority of votes was President, and the one receiving the next highest number Vice-President.

3. It means that a person found guilty of treason shall not be prevented thereby from transmitting property to his heirs.

4. The preamble.

5. The representatives, being chosen directly by the people, reflect their will, and so it was provided that they might be changed every two years.

6. It diffuses power, and one house acts as a check upon the other.

7. The Senate is a perpetual body; its members are elected for six years instead of for two; it has fewer members; they are elected by the legislatures of the States instead of by the people; the qualifications are higher; States have equal power in the Senate, but unequal power in the House of Representatives.

8. The Senate corresponds to the House of Lords, and the House of Representatives to the House of Commons.

9. In the formation of Congress the federal and national ideas were in conflict. A compromise was made. The Senate embodies the federal idea, or equality of State representation.

10. From the consent of the governed.

11. The chief-justice.

12. When the Senate is equally divided.

13. Each house determines its own rules of procedure.

14. Each house keeps a journal of its proceedings, which it is obliged to publish.

15 The governor of the State from which such person has fled sends a *requisition* to the governor of the State in which he is found, demanding his delivery.

16. All the persons employed by the United States, from members of the Cabinet to the lowest clerks in the post-office, except the army and navy.

17. By making the term longer than a representative's term, a body of wiser and more experienced men is obtained The longer term gives this body an independence of popular impulses, and thus serves to check hasty legislation by the House.

18. By the vote of the senators, each State has two votes; in the Continental Congress each colony had one vote, determined by the majority of its delegates.

19. They are arranged in three classes, so that one third of the senators retires every two years.

20. When it is about to adjourn.

21. If only a bare majority were necessary for conviction, party spirit might influence the decision and political discord result. If

more than a two-thirds vote were required, justice might be delayed and misgovernment go unpunished.

22. The power to compel the attendance of absent members.

23. I forbid.

24. Because any division of the people in classes would be contrary to the fundamental principle of the government,—"all men are created equal."

25. Necessity might require the calling out of the army during the adjournment of Congress; again, firmness and promptitude are necessary to render any army effective, and Congress would consume time in discussing and determining what to do.

26. In cases of impeachment.

27. Courts in which suits may be begun have *original* jurisdiction, and courts to which suits are appealed have *appellate* jurisdiction.

28. In the Supreme Court of the United States.

29. He cannot.

30. A reprieve is the suspension of a sentence for an interval of time, thereby delaying execution.

31. Not for more than three days without the consent of the other.

32. The militia consists of all the able-bodied men of the nation, between certain ages (except a large number of persons holding office under the States or the United States, convicted criminals, and men of unsound mind), who may be called into service in time of war or insurrection.

33. Over the District of Columbia.

34. Because it is not a part of any State and has no representation in Congress.

35. In cases of rebellion or when the public safety demands it.

36. It is a written document sent to Congress upon its convening, embodying the President's opinions and suggestions as to legislation, and is accompanied by full reports of the executive departments of the government.

37. He cannot.

CHAPTER X.

READING.

For Third Grade.

1. What is the word-method of teaching reading?

2. Name and define two other methods.

3. What method is now very widely adopted?

4. What argument is there for using script, rather than print, when beginning to teach reading?

5. State the advantages of teaching beginners to read by means of the blackboard and crayon, rather than by chart and printed book.

6. Name several ways of giving variety to reading-lessons.

7. Name three ways by which words may be emphasized.

8. What words admit of emphasis by time?

9. What are inflections?

10. What shade of meaning is given by upward inflections?

11. What idea is conveyed by downward inflections?

12. What inflection should be given to a question when the asker expects either the answer *Yes* or *No*, but does not know which will be given?

13. What inflection should be used when one knows the answer will be *Yes*, or when it will be *No*?

14. By what organs is the voice produced? What are the speech-organs?

15. What note represents the average natural pitch of the voice?

16. Where, with reference to this, are the three grades of pitch—high, middle, and low?

17. How may the degrees of rate in reading be indicated?

18. Name three degrees of force.

19. To what extent would you require pupils to read at sight?

20. How may poor enunciation in reading be corrected?

21. State two plans for preventing pupils from memorizing reading lessons.

22. What plan is to be pursued with a pupil who does not read loud enough?

23. What benefits result from the use of supplementary reading matter?

24. Give your method of teaching reading to a second-reader class.

ANSWERS TO READING—THIRD GRADE.

1. A method by which children are taught to recognize words as wholes, these being regarded as the representations of ideas.

2. The sentence and the phonic method. The sentence-method is based upon the principle that, as a thought is the "unit of thinking," a sentence is the "unit of expression," and consists, first, in putting the child in possession of the thought, and then placing before him the sentence which is the expression of that thought. Sentences are therefore treated as wholes, as words are in the word-method.

In the phonic method, no mention is made of the names of the letters; but beginning with the short vowel sounds and using for a time only one sound for each consonant or digraph, the pupil learns the power of the letters as they enter into new combinations. New sounds are gradually introduced, until the pupil is able to help himself in the pronunciation of words.

3. A method which has resulted from combining parts of the sentence, the word, and the phonic method.

4. If script is used, the child learns at once to write by copying on his slate the words and sentences of the reading-lesson. The transition from script to print has been proved by experience to be a very easy and natural one. Thus there is an economy of time, as the child has no use for printing.

5. "First, the words are created by the hand of the teacher before the eyes of the children; second, the word is written alone in large letters, separated from all other objects of interest except the object it names; third, the attention of the little group is thus directed to one object in a very simple manner; fourth, words are learned by *repeated* acts of association, and charts and primers do not repeat words times enough for the child to learn them."—*Parker.*

6. Let the pupils read words in turn around the class; let the teacher read every other word in turn with each pupil of the class; let the pupils read from pause to pause in turn; let the teacher call upon members of the class to read; let each pupil read till he makes a mistake, the one discovering the mistake to read next; direct one pupil to read till another is called upon.

7. By speaking the word with more force; by speaking the word slowly or giving it more time; and by speaking the word with the upward or the downward slide of the voice.

8. Words containing the longer vowel sounds.

9. Inflections are slides of the voice, either upward or downward, or a union of these.

10. "All upward inflections have the general idea of *negativeness,* of *suspension,* of *incompleteness.*"—*Barlow.*

11. "Downward inflections have the general idea of *positiveness, completeness, determination, authority, denunciation,* or *terror.*"—*Barlow.*

12. The rising inflection.

13. The falling inflection.

14. By the chest and larynx; the lips, teeth, tongue, and palate.

15. The middle D.

16. The middle pitch is upon the middle D; high pitch upon C or B, above this: low pitch upon the G or F ♯ below this.

17. By the number of syllables uttered in a second. *Moderate* rate, four syllables in a second; *rapid* rate, six syllables in a second; *slow* rate, two syllables in a second.

18. Loud, medium, and soft forces.

19. For the younger pupils at least half the time with carefully graded reading matter. Older pupils should be given more than this.

20. Give the pupil vocal drill upon the sounds of the letters. Drill upon selected sentences containing words not properly enunciated. If the pupil is a fast reader, require him to read slowly, making each word especially distinct. Send pupil to a distant part of the room, or into the hall when this can be done, and require him to read so that the class can understand every word.

21. Memorizing comes from reading and re-reading the same lessons. Give the pupil, then, much supplementary reading.

Another plan is to finish each paragraph thoroughly before taking up the next, and after the lesson is finished do not read it again for a long while.

22. If the pupil is timid, have concert reading till he has gained confidence, though the teacher must use great care with reading in concert. If it is from a weak voice, write sentences on the blackboard requiring a good deal of expression, and by emulation see which pupil can read it most distinctly and with full voice.

Oftentimes special drill must be used.

23. It makes ready and intelligent readers. It gives power to get the thought rapidly, and in telling what has been read, to convey the thought easily to others. It enlarges the pupil's vocabulary, gives him familiarity with styles, and increases his general information.

24. Left for the student.

CHAPTER XI.

RHETORIC AND COMPOSITION.

For Second Grade.

1. What phases of punctuation belong to rhetoric, and what to elementary composition?

2. What numbers should be written in words, and what in figures?

Punctuate the following, and give reasons:

3. England Sir is a nation which still I hope respects and formerly adored freedom

4. The interests of large classes had been unfavorably affected by the establishment of the new diligences and as usual many persons were from mere stupidity and obstinacy disposed to clamor against the innovation simply because it was an innovation

5. I have observed that he was a simple good-natured man he was moreover a kind neighbor and an obedient henpecked husband

6. Vision and manipulation these in their countless and indirect and transfigured forms are the two coöperating factors in all intellectual progress

7. Well then replied his sister come with me

DICTION.

8. What is meant by diction?

9. Define purity, propriety, and precision of diction.

10. Distinguish between an obsolete and an obsolescent word.

11. What do you understand when speaking of the use of a word that it is reputable, national, present?

12. What do you understand by a *provincialism?*

13. What is meant by a *barbarism?*

14. What is a *solecism?*

15. What faults are most general in the selection of words?

16. What do you understand slang to be?

Tell what property of diction is violated in these sentences, giving the word you regard as proper:

17. He considers the design his masterpiece.

18. You want to get your ticket to-day.

19. The majority is predicated on the estimations made by the experts of the associated press.

20. I expect they sailed yesterday.

21. A workman is often encouraged by a little praise.

22. He became enthused upon the subject.

23. The noise in the room overhead aggravates me immensely.

24. The load of coal was dumped by the gate.

25. His aunt is a saleslady in that store.

QUALITIES OF STYLE.

26. Define style.

27. Define a periodic sentence; a loose sentence; a balanced sentence.

28. Name four distinct methods of varying a sentence.

29. When is a sentence said to be clear?

30. Mention four ways in which clearness of expression may be secured.

Reconstruct these sentences, making them clear:

31. He had inherited some acquaintance with medicinal herbs and their preparation from his mother.

32. I wish this unnatural struggle was over that we

might again meet our friends and relatives in peace and love from the bottom of my heart.

33. Miss Peyton ornamented in front with a broad border of lace wore on her head a cap of exquisite lawn.

34. The exclusive education of English boys comprised only the classics up to a very recent period, and that in a pedantic way.

35. What is meant by unity of a sentence?

36. Mention five faults to be avoided in securing this.

37. How may a sentence be made strong or energetic?

38. What is meant by harmony?

39. What is a paragraph?

40. What is meant by the "squinting" construction?

41. Distinguish between ambiguity and obscurity.

42. What is meant by the "splitting of particles"?

43. Write three idiomatic sentences.

Render these sentences strong in expression:

44. I saw the place where the battle was fought for the first time yesterday.

45. The enemy arrived at, but did not proceed into, the town.

46. They descended down into the ravine.

47. I am sure that the very identical person to whom you allude was walking in the park this afternoon.

48. The use of tobacco is a habit which many men are slaves to.

49. It is a very general custom for men and boys usually to take a morning bath in the waters of the bay, even when they often have first to break the ice.

50. The warp of English is Anglo-Saxon, but the woof is Roman, as well as the embroidery.

FIGURES.

51. Define figurative language.

52. Name four figures founded on comparison, and define each, giving an example.

53. Name five figures founded on contrast, define each, giving an example.

54. Name and define three figures founded on association.

55. Give an example of each.

56. Name and define two figures founded on imagination, giving an example of each.

57. Define exclamation. Give an example.

58. How are parable and fable related to allegory?

59. Distinguish between fable and parable.

60. Name the figures illustrated by the sentences given below. If any are faulty, point out and correct the faults.

61. "Truth, like the angel in Jacob's vision, bids me up and on."

62. He was swamped in the meshes of his argument.

63. The house has been spoiled by improvements.

64. "We were ever from the cradle bred together."

65. "It is well to die, if there be gods; and it is sad to live, if there be none."

66. Life flows on like a river, ever the same, never the same.

67. "Words are the counters of wise men," and the money of fools.

68. Storms shall sob themselves to sleep.

69. You are a nice girl to treat me in that way.

FORMS OF COMPOSITION.

70. Into what two main classes are all forms of composition divided?

71. Name the six main kinds of poetic composition.

72. Distinguish between a comedy and a tragedy.

73. In what particulars do epic and dramatic poetry differ?

74. What is scanning?

75. Name the measure of the following extracts, marking the feet in each:

76. "For the moon never beams, without bringing me dreams
Of the beautiful Annabel Lee."

77. "The splendor falls on castle walls,
And snowy summits old in story."

78. "As in the youth of the world, in the days before evil and conscience."

79. "All the hearts of men were softened
By the pathos of his music."

80. What is meant by the "time-unit" in scanning?

81. Name ten forms of prose composition.

82. By illustration, show what is meant with reference to letters by the following: the heading; the address; the subscription; the superscription.

83. To what species of composition would you assign the following works?—

(*a*) Scott's "Lay of the Last Minstrel;"

(*b*) Hawthorne's "Scarlet Letter;"

(*c*) George Eliot's "Silas Marner;"

(*d*) Halleck's "Marco Bozzaris;"

(*e*) Bryant's "Planting of the Apple-tree;"

(*f*) Irving's "The Voyage;"

(*g*) Tennyson's "Enoch Arden;"

(*h*) "Topics of the Time," in *The Century;*

(*i*) "The Editor's Literary Record," in *Harper's Magazine;*

(*j*) Helen Hunt's "Bits of Travel Abroad;"

(*k*) Boswell's "Johnson."

84. Define wit.

85. What is a pun?

86. What is meant by retort? What by repartee?

87. What is satire? What sarcasm?

88. What is meant by a burlesque? What by a parody?

89. Define humor.

90. In what does it differ from wit?

91. What is pathos?

92. Mention the qualities that constitute the beautiful in writing.

93. Mention the qualities that are requisite in order that a piece of composition shall be sublime.

ANSWERS TO RHETORIC AND COMPOSITION, SECOND GRADE.

1. The rules for the colon, semicolon, dash, parenthesis, brackets, and the more difficult ones for the comma are taught in rhetoric; while those for the simpler uses of the comma, the use of the period, the exclamation and interrogation points, are taught in elementary composition.

2. In words: distances (as, forty miles farther, eight feet higher); time of day (as, eleven o'clock); population (as, twelve millions). In figures: the day of the month; the year; amounts of money (as, $500.50), per cents (as, 19.6 per cent).

3. "England, sir, is a nation which still, I hope, respects, and formerly adored, freedom." *Sir* is a noun of address; *I hope* is a parenthetical expression. Comma after *adored*, as freedom is also the object of *respects*.

4. "The interests of large classes had been unfavorably affected by the establishment of the new diligences; and, as usual, many persons were, from mere stupidity and obstinacy, disposed to clamor against the innovation, simply because it was an innovation." Semicolon after *diligences*, as the clause is not closely connected with the following one; commas inclose *as usual*, being a parenthetical expression; commas after *were* and before *disposed*, because the auxiliary is separated from the principal verb; comma after *innovation*, to separate the clause which follows, as it is dependent.

5. "I have observed that he was a simple good-natured man; he was, moreover, a kind neighbor, and an obedient henpecked husband." Semicolon after *man*, because the clauses are connected in thought but not grammatically; commas inclose *moreover*, it being a parenthetical word; comma after *neighbor*, as it is coördinate with the following phrase.

6. "Vision and manipulation—these, in their countless and indirect and transfigured forms, are the two coöperating factors in all intellectual progress." The dash is used after *manipulation*, to mark the transition from particulars to the generalization which includes them. The phrase coming between the subject *these* and the verb *are* is inclosed in commas, because the verb is considerably removed from its subject.

7. "Well, then," replied his sister, "come with me." Comma after *well*, it being a parenthetical word; commas inclose *replied his sister*, because the words of the writer have been inserted in the quoted words; quotation-marks inclose the two parts of the quotation.

8. Diction treats of the selection and right use of words.

9. Purity of diction is using such words only as belong to a language, and whose usage is sanctioned by the best speakers and writers; propriety of diction is using only such words as express the meaning which a person intends to convey; precision of diction is selecting only such words as express just what is meant and no more.

10. An obsolete word is one no longer used; an obsolescent word is one falling into disuse.

11. Reputable words are those used by educated writers; national, are those neither local nor foreign; present words are the usage of the generation in which one lives.

12. Words used only in certain sections of the country are *provincialisms.*

13. Any violation of purity is a *barbarism.*

14. A violation of syntax is a *solecism.*

15. The use of provincialisms and barbarisms and slang.

16. Slang is a word or expression created without authority, or misused.

17. He *regards* the design, etc. Propriety violated.

18. You *ought* to get, etc. Propriety violated.

19. The majority is *predicted,* etc. Propriety violated

20. I *suspect,* etc. Propriety violated.

21. A workman is often encouraged by a little *commenc̆ation.* Precision violated.

22. He became enthusiastic, etc. Purity violated.

23 The noise in the room overhead *annoys* me *greatly.* Precision violated.

24. The load of coal was *emptied* by the gate. Propriety violated.

25. His aunt is a saleswoman in that store. Purity violated.

26. That part of rhetoric which treats of the mode of expression is termed style.

27. A periodic sentence is one so constructed that the main point is kept in suspense till the very close. A loose sentence is one so constructed that it may be ended in two or more places and each time give a complete meaning. A balanced sentence is one containing two clauses similar in form and contrasted in meaning.

28 (1) Direct quotations may be made indirect quotations; (2) infinitive phrases may be changed into clauses; (3) adjective phrases may be changed to relative clauses; (4) absolute phrases may be changed into adverb clauses.

29 When its meaning cannot be mistaken.

30. (1) Place the adverb so that it cannot easily be taken to qualify any other than the intended word; (2) use the same care with regard to clauses; (3) avoid the "squinting construction;" (4) avoid ambiguity in the use of pronouns.

31. He had inherited from his mother some acquaintance with medicinal herbs and their preparation.

32. I wish from the bottom of my heart this unnatural struggle was over, that we might again meet our friends and relatives in peace and love.

33. Miss Peyton wore on her head a cap of exquisite lawn ornamented in front with a broad border of lace.

34. The exclusive education of English boys, up to a very recent period, comprised only the classics, and that in a pedantic way.

35. So constructing a sentence that the impression it leaves upon the mind is one undivided whole.

36. (1) Changing the subject of thought; (2) crowding together things unconnected; (3) inserting relative clauses into relative clauses; (4) unnecessary parentheses; (5) adding supplementary clauses after the sentence is apparently closed.

37. (1) Omit all redundant words; (2) avoid the frequent use of *very* and other intensive expressions; (3) use words marking connection or transition with care; (4) give important words a prominent position in the sentence.

38. Such combination of words as will please the ear by smoothness of sound.

39. A group of sentences closely related in thought.

40. A word or expression in such position in a sentence that it can be connected in meaning with what is before or what follows it.

41. A sentence has the fault of ambiguity when it conveys two or more meanings; obscurity, when the meaning cannot be determined.

42. Separating a preposition from the noun which it governs: *e.g., I speak relative to, and in approval of, the plan.*

43. The party took place yesterday. The man was beside himself with rage. Under the circumstances, he fell asleep.

44. I saw for the first time yesterday the place where the battle was fought.

45. The enemy arrived at the town, but did not proceed into it.

46. They descended into the ravine.

47. I am sure that the identical person to whom you allude was walking in the park this afternoon.

48. The use of tobacco is a habit to which many men are slaves.

49. It is a general custom for men and boys to take a morning bath in the waters of the bay, even when they have first to break the ice.

50. The warp of English is Anglo-Saxon, but the woof as well as the embroidery is Roman.

51. Any deviation from the plain, ordinary way of speaking.

52. (1) Simile, formally likening one thing to another. Example: "Fortune is fickle as the wind." (2) Metaphor, an implied

comparison. Example: "The *golden water* came again upon the wall." (3) Allegory, a description of one thing under the image of another, usually making a complete story. Example: "Pilgrim's Progress." (4) Personification, attributing life to things inanimate. Example: "The morning stars *sang* together."

53. (1) Antithesis is a form of expression which impresses an idea upon the mind by bringing opposites into one conception. Example: "To Adam paradise was a home; to the good among his descendants, home is a paradise." (2) Interrogation consists in putting opinions in the form of questions for the purpose of expressing one's views more strongly. Example: "Shall not the Judge of all the earth do right?" (3) Irony is ridiculing anything under a pretence of praising it. Example: "No doubt but ye are the people, and wisdom shall die with you!" (4) Epigram is a figure in which the apparent meaning is contradictory of the real meaning. Example: "Language is the art of concealing thought." (5) Climax is a figure in which there is an increase of strength step by step from particulars of a lower to a higher interest. Example: "The power of man, his greatness, his glory, depend on essential qualities."

54. (1) Metonymy is a figure in which the name of one object is put for some other, the two being so closely related that one suggests the other. (2) Synecdoche is a figure in which the name of a part is put for the whole or the whole is put for a part. (3) Allusion is a figure by which some word or phrase in a sentence calls to mind by means of some likeness something which is not mentioned.

55. (1) The dish was well cooked. (2) Thirty sails were seen off the coast. (3) Where is "False, fleeting, but not quite perjured Clarence"?

56. Apostrophe is a figure in which, instead of speaking of an object or individual in the third person, we address it in the second person. Example: "Blow, blow thou winter wind!" Hyperbole is a figure which consists in representing things greater or less, better or worse, than they really are. Example: "He was a man of boundless knowledge."

57. Exclamation is a figure which expresses a thing strongly by expressing emotion on account of it. Example: "What a piece of work is man! how noble in reason! how infinite in faculties!"

58. Allegory is a term applied to extended works. Short allegorical stories are called fables or parables.

59. Any short allegorical story is called a fable except when it relates to the Holy Scripture, when it is a parable.

60, 61. The figure of personification is embodied in "Truth"; "like the angel in Jacob's vision," is a simile.

62. Metaphor. It is faulty in that it is a mixed metaphor.

63. Epigram.

64. A metonymy is found in the word "cradle"

65. Antithesis.

66. There is a metaphor in "flows;" a simile in "like a river;" "ever the same, never the same," form an antithesis.

67. "Counters" and "money" are metaphors.

68. Personification.

69. Irony.

70. Poetry and prose.

71. Epic, dramatic, lyric, elegiac, pastoral, didactic.

72. Comedy aims to amuse, and deals with the topics of common life. It is full of ridicule and satire, and generally ends in the marriage or some good fortune of the principal characters. Tragedy is serious and dignified, having for its subject some great transaction. It delineates strong passions, and especially scenes of suffering and death, and generally ends in the death of the chief character.

73. They differ in form. What the epic relates as having occurred, the dramatic represents, its form being exclusively that of dialogue.

74. Scanning is resolving a verse into its metrical feet.

75, 76. | Fŏr thĕ mo͞on | nĕvĕr beāms | wĭthoŭt brĭng | ĭng mĕ dreāms |
| Of thĕ beāu | tĭfŭl Aı̄n | ăbĕl Le͞e. |
Anapæstic tetrameter alternating with trimeter.

77. | Thĕ splēn | dŏr fālls | ŏn cās | tlĕ wālls |
| Aŭd sno͞w | ў sūm | mĭts old | ĭn stōry. |
Iambic tetrameter.

78. | Ās ĭn thĕ | yo͞uth ŏf thĕ | wōrld, ĭn thĕ | dāys bĕfŏre | ēvĭl aŭd | cōnscĭence.
Dactylic hexameter.

79. | Aı̄ thĕ | heārts ŏf | mēn wĕre | sōftenĕd |
| Bў thĕ | pāthŏs | ōf hĭs | mu͞sĭc. |
Trochaic tetrameter.

80. The interval between two accents, which may be left vacant or filled up with one or more short unaccented syllables.

81. Letters, diaries, news, editorials, reviews, essays, discourses, treatises, travels, history, fiction.

82. Heading: 642 Broadway, New York,
June 1st, 1886.

George Adams,
Dear Sir,—

Subscription: Respectfully yours,
Paul Jones.

Address: To George Adams,
73 Pine St.,
N. Y.

Superscription: Mr. George Adams,
73 Pine St.,
New York.

83. (*a*) Metrical romance; (*b*) romance; (*c*) novel; (*d*) lyric, (*e*) pastoral poetry; (*f*) travel; (*g*) metrical tale; (*h*) editorial; (*i*) reviews; (*j*) travel; (*k*) biography.

84. Wit is a quality of style resulting from the discovery of an unexpected relation between ideas. This discovery produces surprise, but no higher emotion.

85. A pun is a witticism in which a word agreeing in sound with another is used instead of it.

86. A retort is a sharp-pointed reply turning back on the assailant the censure or derision he has given. A repartee is a good-natured reply to some witty observation without any loss of good humor on either side.

87. A species of wit used to expose follies and vices and reform abuses. Sarcasm is used only to scourge follies and vices.

88. A burlesque is any degradation of a dignified subject or an elevation of a mean subject. A parody is a burlesque imitating something serious.

89. Humor is wit infused with good-nature and sympathy.

90. Wit is concentrated and comes by intervals and flashes, while humor is capable of being continued for almost any length of time.

91. Pathos is a quality of style expressing sorrow or grief, or sympathy with these.

92. Concrete ideas render composition beautiful because they call up in the mind, through the material objects which they represent, form, color, and motion; harmonious language, figures, and lofty sentiments, when suitably expressed, also contribute to beauty of style.

93. Simplicity of expression, representations of great power, of strong moral purpose, of mystery, of vastness of time or space, contribute to the sublime in writing.

CHAPTER XII.

PHYSICS.

For First Grade.

PROPERTIES OF MATTER.

1. Of what is matter composed?
2. Define a molecule. An atom.
3. What is force? What distinction is made between molar forces, molecular forces, and atomic forces?
4. State the relation which exists between molecules in solids, liquids, and gases.
5. What is Sir Wm. Thomson's estimate as to the average distance between molecules in liquids and solids?
6. Define cohesion; adhesion.
7. Define hardness; ductility; malleability; elasticity.
8. How is cohesive force related to crystallization?
9. What is compressibility, and in what state is matter most readily compressed?
10. Is the solution of a body due to cohesion or adhesion?

MECHANICS OF FLUIDS AND SOLIDS.

11. What is capillarity? Give illustrations.
12. What is surface tension?
13. Can adhesion exist between solids and gases?
14. What is osmosis? Give an illustration.
15. Why does heat expel gases from liquids?

16. Why, as a rule, do bodies expand when heated and contract when cooled?

17. How does an increase of surface affect adhesion?

18. Illustrate adhesion between solids and liquids.

19. What is gravity? What is weight?

20. A body of 2000 pounds' weight at the surface of the earth will weigh how much 4000 miles above the surface of the earth, calling the earth's radius 4000 miles?

21. How far will a body fall in the 7th second?

22. Two pendulums are respectively 25 and 36 inches long. How do the times of their vibrations compare?

23. What is the *centre of gravity?* Must this always reside within the body?

24. What is equilibrium? What is *stable* and *unstable* equilibrium?

25. What principle in hydrostatics is taken advantage of in the Hydrostatic Press?

26. What principle is taken advantage of in making Artesian Wells?

27. What is specific gravity?

28. Taking the specific gravity of petroleum as .88 and the weight of a quart of water as two and one half pounds, find how many gallons of petroleum will weigh fifty pounds.

29. How can the pressure of the atmosphere be shown? What is it to the square inch?

30. What is an air-pump? Is it possible to obtain a perfect vacuum with this machine?

31. How can the expansion of gases be shown?

32. What instrument illustrates the pressure of the atmosphere?

33. Does the atmospheric pressure vary? How is this shown?

34. What is the atmospheric pressure when the barometer stands at $26\frac{1}{2}$ in.?

35. A cubic foot of gas under a pressure of one atmosphere is put under a pressure of two atmospheres. What volume will the gas occupy?

36. What is inertia?

37. What is motion?

38. Define work.

39. What is a foot pound?

40. For what is this unit used?

41. What is energy?

42. What is kinetic energy? What potential energy?

43. Find the energy of a body weighing 41 pounds and moving at the rate of 26 ft. per second.

44. What is the law of *action* and *reaction?*

45. How many kinds of levers are there? Describe each.

46. A lever of the second class is 5 ft. long, the weight is 300 pounds, and the fulcrum is 20 inches from the weight. What power is required to lift the weight?

47. What principle is involved in the wheel and axle? In the pulley?

48. There are four wheels in an upper pulley and four in the lower pulley, with the rope fastened to the lower part of the upper pulley. What power is required to hoist two tons (4000 lbs.)?

SOUND.

49. What property must a sounding body possess?

50. Define vibration and amplitude.

51. Explain the difference between a transverse and a longitudinal vibration.

52. What are the nodes and ventral segments of a vibrating body?

53. In what ratio does the intensity of sound diminish as the distance increases?

54. On what does intensity of sound depend?

55. At what rate does sound travel through the air? Through water?

56. If the velocity of sound is 1090 ft. per second and a sounding body makes 500 vibrations in a second, what is the wave length?

57. What are echoes?

58. An echo is heard from the side of a building in 6 seconds. How far away is the building?

59. How does a *musical sound* differ from *noise?*

60. What is a chord? A discord?

61. How is the sound of the human voice produced?

62. How do we *hear?*

63. How many vibrations must there be in one second that sound may be audible?

64. At how many vibrations in a second does sound cease to be audible?

65. What is an octave?

66. Upon what does *pitch* depend?

67. Why is sound conveyed more readily by a speaking-tube than without?

68. How does sound pass through a solid?

69. To what is reinforcement or resonance of sound due?

70. What is a fundamental tone? What are overtones or harmonics?

LIGHT.

71. What is a luminous body? A transparent body? An opaque body?

72. How is light propagated? What is its velocity?

73. How does the intensity of light diminish?

74. What is the law of the reflection of light?

75. What difference is there between a real image and a virtual image?

76. Why are images seen through small apertures inverted?

77. Two mirrors are inclined at an angle of 45°; how many images of the objects placed between them are seen?

78. What is the law of refraction?

79. What is the solar spectrum? How obtained?

80. What are Fraunhofer's lines?

81. What is the difference between continuous spectra and discontinuous spectra?

82. Of what is "white" light composed?

83. What are lenses? Name the different kinds?

84. How can you find the focal length of a converging lens?

85. What will happen to parallel rays passing through a double-convex lens?

86. Explain spherical aberration and state how this is overcome.

87. Explain chromatic aberration and state how this is overcome.

88. What kind of a lens does the eye contain?

89. What is the difference between a single and a compound microscope?

90. What effect has a double-concave lens upon parallel rays?

91. Where will an object seen in a mirror appear to be, in relation to the reflecting surface? Is the object itself seen in using a mirror?

92. What causes double refraction?

93. What is the difference in color resulting from the mixture of the spectral colors yellow and blue, and the mixture of yellow and blue pigments?

94. To what are the colors seen in a soap bubble or the colors seen when a drop of oil is put upon water due?

HEAT.

95. Define heat.

96. How does heat affect the size of a body?

97. What is meant by the conductivity of a body?

98. Why does water boil more quickly in a kettle covered with soot than in one that is new and bright?

99. How do liquids and gases conduct heat?

100. What is evaporation? Condensation?

101. State the conditions which affect the rapidity of evaporation.

102. How are bodies heated by convection?

103. When water is placed in a vessel over a fire why does the water rise from the bottom continually?

104. What is a thermometer? On what principle does it act?

105. What are the fixed points on a thermometer?

106. Change $-36°$ Centigrade to Fahrenheit reading, and $-36°$ F. to Centigrade reading.

107. How does luminous heat differ from obscure heat?

108. State the general laws of heat.

109. What is a diathermanous body?

110. What effect has pressure on the boiling-point?

111. What is the specific heat of a substance?

112. Define latent heat.

113. What is the boiling-point of water? What is the freezing-point?

114. What substances expand in solidifying?

115. Explain what is meant by the maximum density of water, and state at what temperature water reaches its maximum density.

116. Why does water when frozen occupy more space than when in a fluid state?

117. What is the principle on which freezing-mixtures are based?

118. For what purpose is the hygrometer used?

119. What is the mechanical equivalent of heat on the Fahrenheit scale? The Centigrade scale?

120. An iron ball weighing 2 lbs. falls through 4170

feet; if all the heat generated be absorbed by the ball, find the temperature when its fall is arrested, the specific heat of iron being .114.

ELECTRICITY.

121. State the first law of magnetism.

122. Define the magnetic field.

123. Explain why a bar of steel or iron when magnetized becomes slightly longer and slightly narrower.

124. What is an astatic needle?

125. What is a voltaic cell?

126. What is a conductor? What a non-conductor?

127. In a voltaic cell which plate is the negative pole, and which the positive pole?

128. What is meant by the polarization of a cell?

129. Describe Bunsen's cell; Daniell's cell.

130. Define external and internal resistance.

131. What is a voltaic battery?

132. Define the terms ohm, volt, ampere.

133. State Ohm's law.

134. Explain the formula $C = \frac{E}{R}$.

135. What is a shunt? What is the law of the division of the current?

136. What is the resistance in a circuit when an E.F.M. of 8 volts gives a current of 1.6 amperes?

137. Five cells, each having an E.M.F. of 1.2 volts, an internal resistance of 1.5 ohms, an external resistance of 6.5 ohms are arranged in series. Find the strength of the current.

138. A magnetic needle is suspended by a silk thread, and a wire conveying a current of electricity is placed parallel to the needle and alongside it. What is the effect?

139. What is a galvanometer?

140. What is a relay battery?

141. What is an electromagnet?

142. State the conditions under which two parallel wires conveying a current of electricity will repel each other.

143. What is the law of the production of a current by moving a magnet in and out of a helix?

144. How can you determine which is the north end of the core of a helix?

145. What is electrolysis?

146. What is an induction-coil?

147. In what manner are arc lights and incandescent lights coupled or connected with a dynamo?

148. What is an electroscope?

149. In what ways can electricity be developed?

150. Describe a Leyden jar.

151. How is thermo-electricity produced?

152. What is a secondary or storage battery, and on what principle does it work?

ANSWERS TO PHYSICS. FIRST GRADE.

1. Of molecules.

2. Molecules are the smallest particles of matter that can exist independently. An atom is the smallest division of matter and cannot exist independently.

3. That cause which alters or tends to alter either the direction of the motion of a body or the amount of that motion.

Molar forces are those which act between masses of matter at sensible distances from one another. Molecular forces, those which act between molecules at insensible distances from one another. Atomic forces, those which act between the atoms composing a molecule.

4. In solids the molecules are closely crowded together; in liquids they move freely among one another, while in gases they are far apart and repel one another.

5. He estimated that the average distance between the centres of two adjacent molecules of a liquid or a solid is less than the $\frac{1}{500,000}$ and greater than $\frac{1}{1000000000}$ of a centimetre.

6. Cohesion is contact existing between molecules of the same kind. Adhesion is contact existing between molecules which are unlike.

7. Hardness is a state of molecular arrangement which resists intrusion. Ductility is a molecular arrangement which allows a body to be drawn out to great lengths, as a wire of platinum. Malleability is such a molecular arrangement as permits a body to be hammered out into a sheet, as gold leaf. Elasticity is a molecular arrangement which causes a body to return to its original position on being displaced.

8. Cohesive force tends to arrange molecules in regular shapes.

9. A body is compressible when it can be reduced in size by pressure. Gases are most compressible.

10. Adhesion.

11. Capillarity is the tendency which liquids have to rise in small tubes, or at the sides of vessels. The sponge is a good illustration.

12. The molecules which constitute the surface layer of a liquid, unlike the molecules in the body of the liquid which are attracted in all directions, are attracted only downwards and sidewise. The effect is that the surface layer of molecules, because of this attrac-

tion, exerts a tension like a stretched membrane, and also exerts a pressure on the liquid below.

13. It can.

14. Osmosis is the passage of liquids and gases through membranes. Illustration: The oxygen of the air reaching the blood by passing through the delicate walls of the lungs and the small blood-vessels.

15. Heat increases the *repellent* force between the molecules; the adhesion of the gas to the liquid is thus overcome.

16. As the molecules repel one another they occupy more space.

17. An increase of surface increases the adhesive force.

18. When the hand is dipped in water it comes out wet. A body immersed in any substance, properly a liquid, will bring away part of the liquid when withdrawn.

19. The attraction existing between bodies is called gravity. Weight is the attraction of bodies toward the earth.

20. The distance from the centre is doubled. The square of this distance in units is 4. As the weight decreases as the square of the distance, the body will weigh $\frac{1}{4}$ of 2000 pounds or 500.

21. $7 \times 2 - 1 = 13$. 13×16 ft. $= 208$ ft. in the 7th second.

22. $\sqrt{25} : \sqrt{36} :: 5 : 6$.

23. The centre of gravity is the point about which all the parts of a body are balanced. It may be without the body.

24. A body at rest is in equilibrium. Stable equilibrium is such a state of the body that on being slightly disturbed it returns to its position of rest again. When the body seeks a new position of rest on being disturbed, it is said to be in unstable equilibrium.

25. Pressure on liquids is communicated equally in all directions.

26. Water always rises to its level.

27. The weight of a body compared with the weight of an equal bulk of another body taken as a standard.

28. $2\frac{1}{2}$ lbs. $= 40$ oz. $\times .88 = 35.2$ oz. weight of a quart of petroleum. 50 lbs. $= 800$ oz. $\div 35.2 = 22.72 +$ no. of quarts $=$ 5.68 gal.

29. The pressure of the atmosphere will raise mercury 30 inches in a glass tube. It also causes water to rise in pumps. About 15 lbs. to the square inch.

30. An air-pump is an instrument for removing the air from a closed vessel. It is not possible to obtain a perfect vacuum with this machine.

31. Air is condensed in an air-gun. When the pressure is removed the expansion of the air expels the bullet with great force.

32. The barometer.

33. It does. By the different heights to which the mercury in a barometer rises.

34. 30 in. : 26.5 : : 14.7 lbs. : x. Ans. 12.98 lbs.

35. As the volume of gas inversely proportional to the pressure exerted upon it, we have $1 : 2 : : (\frac{1}{2}) : 1$. Ans. One half a cubic ft.

36. The inability of a body, either at rest or in motion, to change its state is called inertia.

37. Motion is continuous change in the position of a body.

38. Work is the overcoming of resistance of any kind.

39. A foot pound is the work done by the expenditure of a force that will raise one pound one foot high.

40. This unit is used to estimate the work done by the action of a force on a body.

41. Energy is the ability of matter to do work by virtue of work having previously been done upon it.

42. Kinetic energy is the ability to do work due to the motion of a body. Potential energy is the ability to do work due to the position of a body.

43. Formula $\frac{\frac{1}{2}WV^2}{32} = \text{K.E.}\ \frac{\frac{1}{2}(41) \times \overline{26}^2}{32} = 433\frac{1}{16}$.

44. Action is equal to reaction. but opposite in direction.

45. There are three kinds of levers ; in the first kind, the fulcrum is between the power and the weight ; in the second, the weight is between the power and the fulcrum ; in the third, the power is between the weight and the fulcrum.

46. W in lbs. $\times$ Wd in in. $\div$ Pd in in. $=$ P in lbs.
300 $\times$ 20 $\div$ 60 $=$ 100.

47. The principle of the lever is involved in each.

48. 4000 W in lbs. $\div$ 8 no. of parts of the cord supporting the W $=$ 500 P in lbs.

49. The property of vibration.

50. Vibration is motion back and forth. Amplitude is the distance a body swings in vibrating from the farthest point on one side of its position of rest to the farthest point on the other side.

51. A transverse vibration is one in which the vibrating body moves at right angles to the direction of the wave, while a longitudinal vibration is one in which the vibrating body moves parallel to the direction of the wave.

52. The nodes are the parts that have the least motion ; the ventral segments are the vibrating parts between the nodes.

53. The intensity of sound decreases as the square of the distance increases.

54. The intensity of sound depends upon the amplitude of the vibrations.

55. The velocity of sound in air, at 32° Fahrenheit, is 1090 feet per second ; in water, 4708 feet per second.

56. $1090 \div 500 = 2\frac{9}{5}\frac{0}{0}$ feet wave length.

57. Echoes are sound waves which after reflection are audible.

58. $\frac{1}{2}$ of 6 sec. = 3 sec. time it takes the sound to travel one way. 1090 feet velocity of sound × 3 = 3270 feet distance of building.

59. Musical sounds are produced by vibrations at regular intervals. If the vibrations are irregular, the result is simply noise.

60. A harmonious combination of two or more notes is a chord. When the notes are not harmonious a discord occurs.

61. The sound of the human voice is produced by the vibration of the vocal chords.

62. The vibrations of the air beat against the tympanum of the ear. These vibrations are communicated to the brain. The comprehension of these vibrations by the brain is called hearing.

63. At least 16 vibrations per second.

64. When the vibrations are more than 38,000 per second.

65. An octave comprises the sounds produced by vibrations between a given rate and a rate twice as rapid.

66. Upon the rapidity of the vibrations.

67. A speaking-tube prevents the vibrations from spreading in all directions. Their force is thus expended in a forward movement.

68. Sound is conveyed through a solid by the vibration of the molecules of the solid.

69. Reinforcement or resonance is a strengthening of sound due to the meeting of two series of sound waves under such conditions that the condensations of one series coincide with the condensations of the other series, and the rarefactions of one with the rarefactions of the other series.

70. The fundamental tone of a vibrating body is the lowest tone that can be made by it without change of length or tension. Overtones or harmonics are the tones higher than the fundamental when a sounding body vibrates in two or more ventral segments.

71. A body which emits light. A body which allows light to pass through it easily. A body which does not allow light to pass through it.

72. Light is propagated in straight lines, radiating in all directions from the luminous body. About 186,000 miles per second.

73. The intensity of light diminishes as the square of the distance increases.

74. The angle of incidence is equal to the angle of reflection.

75. A real image is one that can be thrown upon a screen, while a virtual image is one that appears behind a reflecting surface, as a mirror, and cannot be thrown upon a screen.

76. The rays from the object in order to reach the screen be-

yond the small aperture pass through the small aperture and must there cross, thus producing the inverted image.

77. $360° \div 45° = 8$. $8 - 1 = 7$ no. of images seen.

78. When a ray of light passes from a rarer to a denser medium, it is bent toward a perpendicular drawn to the surface of the denser medium. The opposite occurs when a ray passes from a denser to a rarer medium.

79. A solar spectrum exhibits the colors of which light is composed. It is obtained by passing light through a prism.

80. If a pure spectrum is examined it will be found to be crossed by a number of parallel dark lines. These were first counted by Fraunhofer, and the more marked lines were designated by the letters A, B, C, D, E, F, G, H. Spectrum analysis has grown out of the discovery of these lines.

81. Continuous spectra are those which are not crossed by dark lines, as the spectrum from a candle. Spectra which consist simply of bright lines, as the yellow line from sodium, are discontinuous or Bright Line spectra.

82. "White light" is a union of all the colors of the spectrum.

83. Transparent bodies so formed as to change the direction of rays passing through them. The principal forms are convex, concave, double-convex, double-concave, plano-convex, plano-concave, concavo-convex, and meniscus.

84. Hold the lens in the direct rays of the sun and let the focus fall upon a piece of paper. Move the paper till the spot of light upon it is as small as it can be made. Then measure the distance from the paper to the lens, which will be the focal length of the lens.

85. They will converge.

86. The rays falling upon the margin of convex lenses are refracted more than those falling upon the middle of the lens, and come to a focus nearer the lens than the rays falling upon the middle. This indistinctness of focus is called spherical aberration It is overcome by an annular screen called a diaphragm, which cuts off the marginal rays.

87. As white-light is separated into the colors of the spectrum when refracted, owing to the fact that the violet rays are more refrangible than the red rays, the violet rays come to a focus nearer the lens than the red rays, which produces fringes of color on objects seen through the lens. It is overcome by combining a convex lens of crown glass with a plano-convex of flint glass. These having different degrees of refractive power, the dispersion of one is neutralized by that of the other. Such a combination is said to be achromatic.

88. The eye contains a modified form of the double-convex lens.

89. In a simple microscope a single lens is used, and the object

is seen directly. In a compound microscope a combination of lenses is used, and only the *image* of the object is seen.

90. It causes them to diverge.

91. As far behind the mirror as the object really is in front of it. The object itself is seen, the rays being simply reflected.

92. In certain substances a ray of light is divided into two rays, both of which are polarized. This causes double refraction. Iceland spar has thus the property of dividing rays of light.

93. If the spectral colors yellow and blue are mixed the product is white. If yellow and blue pigments are mixed the product is green.

94. To the interference of light due to the thin films of the refracting substance.

95. Heat is a form of energy. It can be transferred from one mass of matter to another, or it can be transferred into other forms of energy.

96. Heat causes bodies to expand.

97. Conductivity refers to the power a body has to transmit heat.

98. The soot absorbs heat better, while the bright metal reflects the heat.

99. Liquids and gases convey heat by the actual movement of their molecules.

100. Evaporation is the changing of a liquid into a gas. Condensation is the opposite.

101. Rapidity of evaporation is affected by the extent of surface exposed, by the temperature, by the amount of moisture in the atmosphere, and by atmospheric pressure.

102. The molecules being heated rise, those colder taking their place, which in turn rise as they become heated.

103. As the molecules at the bottom become heated they expand, thus becoming lighter. They are then forced up, colder molecules taking their place.

104. A thermometer is an instrument for measuring heat. On the principle that heat expands mercury in far greater degree than it does glass.

105. The point at which water freezes and the point at which distilled water boils.

106. 180° F. = 100° C. Therefore $\frac{9}{5}$° F. = 1° C.

$$-36° \text{ C.} \times \tfrac{9}{5} + 32° = -32.8° \text{ F.}$$

− 36° F. is 68° below the freezing point. $68° \times \frac{5}{9} = -37\frac{7}{9}$° C.

107. Luminous heat is radiated from a luminous body. Obscure heat from a non-luminous body.

108. Heat is radiated in straight lines in every direction from a body and decreases in intensity as the square of the distance increases.

109. A body allowing heat to pass through it readily is called diathermanous.

110. Pressure raises the boiling-point.

111. The specific heat of a substance is the amount of heat required to warm it one degree as compared with the amount required to warm an equal weight of water one degree.

112. Latent heat is the amount of heat which is expended in changing the condition of a body without changing its temperature.

113. That point when steam is rapidly formed in the body of the liquid. That point when the molecules of water arrange themselves in crystals and solidify.

114. Water, antimony, bismuth, cast-iron.

115. When the molecules of water are closest together, that is, when a given amount of water occupies the least possible space. Water reaches its maximum density at 39.2° Fahr.

116. Since water reaches its maximum density at 39.2° Fahr. and does not freeze till it reaches 32° Fahr., it must occupy more space.

117. When a substance melts it takes heat from surrounding substances.

118. A hygrometer is used to measure the amount of moisture in the air.

119. 772 foot pounds is called the mechanical equivalent of heat, Fahrenheit scale. $\frac{9}{5}$ of 772 lbs. = 1390 foot pounds, Centigrade scale.

120. The ball does $4170 \times 2 = 8340$ foot pounds of work, or work that would raise 1 lb. of water $\frac{8340}{1390}$ Cen. degrees of temperature, = 6°. The ball would be heated $6° \times \frac{1}{.114} = 56.6°$ Cen.

121. Like poles repel each other and unlike poles attract each other.

122. The space through which the attractive influence of a magnet extends is the magnetic field.

123. It is due to the fact that the particles of the bar set themselves in their longest direction. A faint click is heard at the instant of magnetization and demagnetization, and if the process is continued rapidly heat is produced in the bar.

124. An astatic needle consists of two magnetic needles so arranged that the magnetism of the earth has no directive influence upon them.

125. A voltaic cell consists of two plates immersed in a liquid which will act chemically on one of them.

126. Iron will convey an electric current, and is called a conductor; glass will not convey an electric current, and is called a non-conductor.

127. The plate on which the liquid acts is positive; the other plate is the negative. The end of the wire connected with the negative plate is the positive pole, and the end connected with the positive plate is the negative pole. When the plates are copper and zinc, the copper plate is negative, and the end of the wire running from it is positive. The opposite is true of the zinc plate.

128. The polarization of a cell is any action tending to set up a current in an opposite direction to the current of the cell.

129. Bunsen's cell consists of a carbon and a zinc plate. The former is immersed in strong nitric acid, the latter in dilute sulphuric acid. A Daniell's cell consists of a copper plate immersed in blue vitriol, and a rod of zinc immersed in dilute sulphuric acid. The two liquids are separated by a porous earthenware cup.

130. External resistance is the opposition a current of electricity meets in the conductor outside the battery. Internal resistance is the opposition the current meets in the exciting fluid of the battery.

131. A number of cells joined together constitute a battery.

132. An ohm is the unit of measurement of resistance. A volt is the unit of electromotive force. An ampere is the unit of measurement of the strength of the current.

133. The strength of the current equals the electromotive force divided by the resistance; or $C = \frac{E}{R}$.

134. E represents the electromotive force in volts, R the resistance in ohms (R = R external resistance and r the internal resistance), and C the current in amperes. If a cell has E.M.F. of 2 volts and there is a resistance of $\frac{1}{2}$ ohm in the cell, and $1\frac{1}{2}$ ohms in the wire, the current will be, $C = \frac{E}{R + r} = \frac{2}{1\frac{1}{2} + \frac{1}{2}} = 1$ ampere.

135. When a current flowing through a wire is divided into two branches and partly flows by one branch and partly by the other —the branches uniting again in one wire—either branch is a shunt to the other. The currents through the shunts are inversely proportional to their resistances.

136. As $C = \frac{E}{R + r}$, $R + r = \frac{E}{C}$. Therefore $R + r = \frac{8 \text{ volts}}{1.6 \text{ amperes}} = \frac{8}{1\frac{6}{10}} = 5$ ohms.

137. 1.2 volts, E.M.F. of one cell, × 5 No. of cells = 6 volts
1.5 ohms, resistance in one cell × 5 = 7.5 ohms = r

$$C = \frac{E}{R + r} = \frac{6 \text{ volts}}{7.5 \text{ ohms} + 6.5 \text{ ohms}} = \frac{6}{14} = \frac{3}{7} \text{ amperes.}$$

138. If the current were strong, it would tend to make the needle dip.

139. An instrument for detecting or measuring an electric current is called a galvanometer.

140. An extra battery brought into use on telegraph wires to work the sounder at a local office.

141. A bar of soft iron placed within a coil of wire through which a current is passing is an electromagnet.

142. When two currents of electricity move through them in opposite directions.

143. An increase in the number of lines of force passing through a helix induces a current in the wire flowing in opposite direction to the hands of a watch. A decrease in the number of lines of force induces a current flowing in the same direction as the hands of a watch.

144. In a right-hand helix, i.e., one whose turns are in the same direction as those of a right-hand screw, the north pole of the core is at the end where the current leaves the helix.

145. The separation of water into oxygen and hydrogen or other substances in solution into their elements or parts by means of a current of electricity is called electrolysis.

146. An induction coil consists of a helix of coarse wire coiled a few times around a bundle of iron wires. This constitutes the primary coil. Outside the primary coil is a helix consisting of a great number of turns of fine wire. By means of a spring a current is made and broken in the primary coils, which induces a current of high tension in the outer helix or secondary coil.

147. Arc lamps are connected in series Incandescent lamps are usually connected parallel.

148. An electroscope is an instrument for detecting frictional electricity.

149. Electricity can be developed by friction, by magnetism, by heat, and by chemical action.

150. A Leyden jar is a wide-mouthed vessel of glass coated within and without, nearly to the top, with tin-foil. It is closed with a stopper through which passes a brass rod ending outside in a ball, and connected with the tin-foil inside. It is an instrument for accumulating by induction charges of electricity.

151. If two metals are heated at their point of union, a current is produced called a thermo-electric current.

152. It is a battery which gives out a current of electricity due to chemical change of its constituents produced by the current of electricity which charges it. The energy of the charging current, by separating the constituents of the battery chemically, is converted into potential energy. When the circuit of the storage battery is closed the potential chemical energy is reconverted by chemical change again into the energy of an electric current.

CHAPTER XIII.

PHYSICAL GEOGRAPHY.

For First Grade.

THE EARTH AS A PLANET.

1. What is the shape of the earth, and in how many ways has this been proved?
2. What is the curvature of the earth to the mile?
3. Define the terms *axis, north pole,* and *south pole.*
4. What is *rotation,* and what does it cause?
5. What is the rate of rotation at the equator? At the poles? At intermediate places?
6. What is the earth's motion of *revolution?* What is the direction of the earth's rotation and revolution, looking down upon these motions from the northern point of the heavens?
7. What is the orbit of the earth? Its shape? Draw it.
8. What is the earth's mean distance from the sun?
9. What is the inclination of the earth's axis? Explain how this and the earth's revolution cause the change of seasons.
10. Draw a diagram to illustrate the direction of the earth's axis in relation to the sun in summer and in winter.
11. What are the equinoxes and solstices, and at what times do they occur?
12. What would be the effect if the earth's axis were perpendicular to the plane of its orbit?
13. What determines the tropics? What the polar

circles? Draw a circle, and upon this lines to represent the equator, tropics, polar circles, and the poles, and write the number of degrees between each.

14. What is longitude? Define prime meridian. What meridian has lately been generally adopted by the world as the prime meridian?

15. Show the relation that time bears to longitude.

16. What is latitude? Show the relation existing between the latitude of any place and the zenith, north star, and horizon.

17. What is meant by "low latitudes"? By "high latitudes"?

18. How do a degree in longitude in India and one in Sweden compare in length, and what inference can be made from the comparison?

19. Give the length of the earth's *mean* equatorial diameter. How does the polar diameter differ from this?

20. In surveying for maps what is meant by *triangulation?*

THE ATMOSPHERE.

21. What is meant by the term *atmosphere?* Of what is air composed.

22. Where is *ozone* most abundant, and of what value is it?

23. What purpose does carbonic acid gas in the air serve?

24. What is water-vapor? Whence is it derived? Explain why it floats in air.

25. What fills space beyond the atmosphere?

26. What change do we find in the air in ascending?

27. What is the pressure of the air to the square inch? By what instrument measured? At what height does the mercury usually stand at the sea-level?

28. Does it ever vary at the sea-level? Should it rise

at the sea-level, in what condition would the atmosphere be? Should it fall, what?

29. What do the terms high-pressure and low-pressure mean?

30. State the two causes of variations of pressure? What are isobaric lines?

31. How is the temperature of the air determined? At what temperature does water freeze? At what temperature does it boil? What are isothermal lines?

32. How is the air heated? Compare the temperature of winter in Quebec and in Reykjavik. Their temperature in summer. What causes the difference?

33. Explain the effects which latitude, the distribution of sea and land, the height above the sea, have on temperature.

34. What is evaporation? When is the air said to be saturated?

35. Explain the effects which wind and heat have upon evaporation, when the air contains but little water-vapor. When a great deal.

36. What effect has the presence of water-vapor in the air upon the temperature of the earth?

37. What is meant by condensation?

38. What is dew? Explain the formation of dew.

39. What effect has a cloudy night upon the forming of dew? Why? What is meant by the dew-point?

40. What is frost? How is mist or fog formed?

41. Explain the origin of the fog often seen rising after sunset from the surface of a river.

42. Explain the formation of clouds. In what ways do clouds disappear from the sky?

43. Why do clouds often seem to remain on a mountain top? Name four varieties of cloud.

44. Explain the formation and fall of rain.

45. How is the rainfall measured? Is it greater over the land or the sea?

46. Why is the rainfall greatest between the tropics?

47. Account for the lack of rainfall in Peru. In Northern Africa and Arabia.

48. How does rain purify the air?

49. How is snow formed? Describe a snow-flake. Why does snow appear white?

50. How is snow valuable to vegetation?

51. What is sleet? What hail? Explain how ice is formed.

52. What is the direction of the movements of air from areas of high-pressure to areas of low-pressure? What causes wind?

53. Explain the nature and origin of sea and land breezes. Of breezes up the valleys by day and down by night.

54. Where is the Belt of Equatorial Calms, and why is it so called?

55. Explain the cause and direction of the trade-winds. What are the calms of Cancer and Capricorn.

56. What are the *monsoons?* What is the *sirocco?* the *solano?* the *simoom?* What the *Harmattan?* Of what office are the winds?

THE CIRCULATION OF WATER ON THE LAND.

57. What becomes of the rain and snow which fall upon the earth?

58. What are springs, and how formed?

59. How do sand and clay differ in regard to the passage of water through them?

60. Where have "Artesian wells" been sunk? Account for their flow of water.

61. What difference is there between the purity of rain water and of spring water?

62. Whence does rain water derive the carbonic acid which it carries below ground?

63. Explain what is meant when we say water is *hard* or *soft*.

64. Wherein do mineral springs differ from ordinary springs? What are brine springs?

65. Explain the action of rain-water in limestone countries.

66. What is the cause of underground tunnels and caverns? What are *stalactites? Stalagmites?*

67. How are streams formed? Why do they flow? What causes their winding courses?

68. In speaking of the banks of rivers, why is it necessary to use the terms right and left bank?

69. What is a water-shed?

70. Why are most rivers low in summer? Why are the Rhine and the Rhone highest at this time? Explain the annual rise of the Nile.

71. What are lakes? What are lagoons?

72. What is thought to be the origin of inland seas?

73. How does the level of the Caspian Sea compare with that of the Black Sea? How the level of the Dead Sea with that of the Mediterranean?

74. What is meant by the chemical and mechanical action of rain? Define erosion. What is meant by detritus?

75. How have river gorges and ravines been formed? What are pot-holes? What is a cañon?

76. Explain the origin of flat terraces bordering a river?

77. Why are many lakes growing smaller?

78. Describe a delta and account for its formation at the mouth of a river.

79. Explain the action of frost in promoting the crumbling of rocks.

80. What is meant by the snow-line? Compare its height at the equator and in the polar regions?

81. What are avalanches? How are glaciers formed? What causes them to move?

82. What are moraines? Explain the terms *lateral, medial,* and *terminal.* What becomes of the glacier as it descends into the valley?

THE SEA.

83. What is meant by the sea? What are the proportions of land and water on the earth's surface? On which side of the equator does most of the sea lie?

84. What is meant by the great sea-basins?

85. How would you define an ocean? Which ocean has the greatest river drainage?

86. What is the cause of the sea's saltness? Name two other important ingredients found in sea-water.

87. How is information regarding the sea-bottom obtained?

88. What are coral reefs and coral islands, and how are they formed?

89. What is protoplasm?

90. How does the temperature at the surface of the sea compare with that towards the deep bottoms?

91. What are icebergs, and how are they formed? What is an ice-floe? What an ice-foot? What is ground-ice?

92. What are tides? Explain the terms ebb and flood tides, high and low water. How often does the tide rise and fall? What is the difference in the time of high or low water on successive days?

93. What are *spring*-tides? What *neap*-tides?

94. Explain why the tide rises and falls. Compare the relative attraction of the sun and the moon upon the sea. Draw a diagram illustrating spring-tides and showing the relative positions of sun and moon. Illustrate also neap-

tides and the relative positions of sun and moon. Give names to the different positions of the moon in your diagram.

95. How much higher is the water at high than low tide in the middle of the Pacific? In the Atlantic?

96. Account for the high tides in the Bay of Fundy and the Bristol Channel.

97. What causes whirlpools?

98. Where is the famous Maelstrom situated?

99. How are waves formed? What is meant on the coast by the ground-swell?

100. What are ocean currents? What causes them?

101. Describe the equatorial current. The Gulf Stream. The Brazilian current. The Japan current. The Labrador current.

102. What effects have these currents upon climate?

103. What is the *Sargasso Sea?*

THE LAND.

104. What is a continent? What is meant by the axis of a continent?

105. What is a mountain range? A mountain chain or system?

106. What is soil. Name several different kinds of rocks.

107. What is true of the temperature of the earth as we go downward from the surface? What are geysers?

108. What is the theory regarding the interior of the earth? Show how the statement that the earth's interior is a "molten mass" gives a false idea.

109. What are volcanoes? What is the crater?

110. Give a short account of the famous eruption of Vesuvius in the year 79.

111. Name the substances which volcanoes emit.

112. State about the number of active volcanoes on the

globe? What can you say about the distribution of volcanoes.

113. What are earthquakes? What do you know of the character of the great earthquake at Lisbon in 1775? Of the Calabrian earthquake a few years later?

114. How has it been calculated from what depths earthquakes arise?

115. What is meant by an upheaval? By subsidence?

116. Define a fringing reef. A barrier reef. An atoll.

117. What is climate? What conditions determine the climate of any region?

118. What is meant by the *flora* and *fauna* of any region?

119. What great peculiarity does the fauna of Australia show?

120. What is meant by primary races? By secondary?

ANSWERS TO PHYSICAL GEOGRAPHY, FIRST GRADE.

1. It is that of a sphere slightly flattened at the poles. Proofs: (1) it has been circumnavigated; (2) when sailing out to sea, the topmasts of ships disappear last; (3) sunrise takes place later as we travel west, and earlier as we travel east; (4) the earth's shadow on the moon is always circular; (5) from any elevation the horizon is equally depressed.

2. About 8 inches to the mile.

3. The axis is the line upon which the earth rotates. The points at which the axis reaches the surface are known respectively as the north pole and the south pole.

4. Rotation is the movement of the earth on its axis, and causes day and night.

5. At the equator, about 500 yards in a second; at the poles, nothing; at intermediate places, it varies according to their nearness or distance from the poles.

6. Its movement around the sun. From west to east.

7. Its path around the sun. It is an ellipse, differing but little from a circle. The eccentricity of the ellipse is $\frac{1}{60}$.

8. 92,897,000 miles.

9. 23½°. In summer the north pole is turned toward the sun, therefore the northern heavens receive a greater amount of heat, causing summer in that hemisphere. In winter the north pole is turned from the sun, and the northern hemisphere is largely deprived of the heat of the sun's rays, thus causing winter. In spring and fall the pole is turned neither to nor from the sun, every place on the earth coming under the influence of the sun's rays.

10. [Left for student.]

11. The equinoxes are when the days and nights are equal, and occur on March 20th and Sept. 22d. The solstices are when the days are at their longest and shortest, and occur about June 21st and Dec. 22d.

12. The days and nights would be equal, and there would be no change of seasons.

13. The tropics, 23½° from the equator, mark the highest latitude which receives the vertical rays of the sun. The polar circles are 23½° from the poles. The Arctic circle marks the limit of illumination when the sun is vertical at the Tropic of Capricorn, and the Antarctic circle the limit of illumination when the sun is vertical at the Tropic of Cancer.

14. Longitude is distance on the earth's surface from a prime meridian, east or west. A prime meridian is one from which lon-

gitude is reckoned. The meridian passing through the National Observatory at Greenwich, near London.

15. Every circle is divided into 360 equal parts or degrees. As it takes 24 hours for the earth to rotate through these 360°, in one hour it travels through 15°; hence 1° is equal to four minutes of time.

16. Latitude is distance north or south of the equator. If the axis of the earth were prolonged, it would cut the heavens near the north star. From the equator to the pole is 90°; the zenith is the point directly overhead. From the zenith to the horizon is 90°. If one were at the north pole the north star would be in the zenith; as one travels southward the north star would leave its place in the zenith moving toward the horizon; when one had travelled 90° southward or to the equator, the north star would move down from the zenith 90°, and hence would be in the horizon.

17. Low latitudes are regions or places lying towards the equator. High latitudes are places situated near the poles.

18. In Sweden it is about ½ a mile longer than in India, which proves the flattening of the globe at the poles.

19. The equatorial diameter is 7925.65 miles. The polar diameter is 26.48 miles less.

20. First, a base-line a few miles in length is accurately measured. At each end of the line a theodolite is set up and sighted upon some object several miles distant. The angles which these sight-lines make with the base-line are carefully measured, and by a mathematical calculation the length of the two sight-lines is found. These two lines and the base-line form a triangle, and from this triangle a system of triangulation is observed all over the country, and distances are thus measured.

21. The whole mass of air surrounding the earth. Four parts of nitrogen and one part of oxygen.

22. Ozone is most abundant in pure country and sea air, and is lacking in the air of cities. It unites with noxious gases, thus purifying the air.

23. Carbonic-acid gas is taken in by growing plants and converted into woody tissue.

24. Water-vapor is the invisible steam always present in the atmosphere. It is evaporated from every water-surface on the face of the globe. Because it is very finely divided.

25. Ether.

26. The air gets lighter or thinner as we ascend, and also grows colder.

27. 14¾ pounds.—Barometer.—About 30 inches.

28. It does.—The atmosphere would be heavier.—The atmosphere would be lighter.

29. When the mercury rises above the average 30 inches it indicates high pressure; when it falls below the average it indicates low pressure.

30. Temperature and the amount of water-vapor in the air.—They are lines drawn on a chart of the globe connecting the points where the atmospheric pressure is equal.

31. By an instrument called a thermometer.—32° Fahrenheit.—212°.—Lines connecting places on the earth having equal temperature.

32. The sun's rays heat the earth's surface, which radiates its heat to the atmosphere. In winter at Quebec the average temperature is 12°; at Reykjavik, 30°.—The average summer temperature of Quebec is 70°; that of Reykjavik, 51°.—Canada is chilled by the cold land and sea lying to the north and northeast of it, while Iceland is warmed by the ocean currents which always sweep by its shores.

33. The tropics are warmest because they receive the greatest amount of the sun's rays. As we pass from the tropics the influence of the sun's rays grows less, and the temperature is cooler. The sea heats slower than the land and retains its heat longer, and because of this changes the temperature of land lying near it; ocean currents heat the air above them, and this air blowing upon the land also affects temperature. As we ascend, the air falls in temperature 1° Fahrenheit for every 300 feet; therefore elevated land would naturally be cooler than low land.

34. Evaporation is the giving off in an invisible form of vapor from water, and when the air can hold no more it is said to be saturated.

35. When the air contains but little water-vapor, wind and heat very quickly dry up damp places and pools of water; but when the air is almost saturated, damp places dry up slower, but even then evaporation goes on much more briskly when a fresh wind is blowing and the sun is shining.

36. It keeps the earth warmer by night and cooler by day, or tends to make the temperature even.

37. The conversion of vapor back again into the state of water.

38. Dew is vapor condensed on leaves, plants, stones, or other objects.—When the sky is cloudless, radiation goes on rapidly from the earth, and the surface of those substances which part with their heat first becomes colder than the air, and thus condenses upon their surfaces the vapor from the atmosphere.

39. On a cloudy night dew does not form at all or only in small quantities, because the clouds prevent the earth from radiating its heat, and the ground does not, therefore, become cold enough to condense upon it the vapor of the air.—The temperature at which dew is deposited. It varies with conditions of the atmosphere.

40. Frost is dew frozen while forming.—When a mass of warm and moist air meets colder air, or in any way cools down below the dew-point, the excess of vapor, which it can no longer retain, condenses into minute particles, and is made visible in the form of mist or fog.

41. As radiation goes on, the ground around the water becomes colder than the water and the vapor is chilled and condensed into banks or sheets of fog.

42. Whenever vapor is carried up into the cold upper parts of the atmosphere it becomes visible in a form of condensation known as clouds.—When clouds come into contact with warmer currents of air, their particles are broken up and become invisible by evaporation.

43. The wind bears with it warm invisible vapor, which, striking the cold mountain top, is chilled and passes into a fine mist. This, seen from a distance, takes the shape of a stationary cloud capping the summit.—Cirrus or curl-clouds, cumulus, stratus, and nimbus.

44. The little water-particles which compose clouds run together as condensation proceeds, and when the drops thus formed become too heavy to float in the air they fall as rain.

45. By an instrument called a rain-gauge.—Over the land.

46. Because of the enormous amount of evaporation taking place there.

47. The high chain of the Andes takes out the last of the moisture which blows from the east across the continent, and the winds that descend upon Peru are so dry that rain is almost unknown. In Northern Africa and Arabia the soil is dry and sandy, and during the day becomes very hot. There is little water to evaporate. The hot, dry air ascends, and the moist winds which blow toward the desert are heated and driven up in the ascending currents.

48. It absorbs certain gases and vapors, and gathers up the organic particles that float in the air.

49. Vapor condensed in the air having a temperature below 32° Fahr. freezes, thus producing snow.—A snowflake is a group of crystals of transparent ice arranged in the form of a star with six rays. The minute surfaces of the crystals reflect all the primary colors; from their combination the flake appears white.

50. Snow being a bad conductor of heat, keeps the soil from parting with its warmth, thus protecting vegetation from being injured by severe cold.

51. When snow is driven through a warm layer of air it begins to melt, and in this half-melted state reaches the ground as sleet.—Hail is rain frozen while descending.—When from any cause water is cooled down to 32° Fahr., it no longer remains in a liquid form, but passes into a solid form known as ice.

52. Air always flows in spirally from areas of high pressure into areas of low pressure.—Owing to the unequal heating of the earth's surface by the sun, and the varying amount of water-vapor in the air, the pressure of the atmosphere never remains stationary, and movements of the air called winds result from these differences of pressure.

53. During the day the surface of the land becomes warmer than that of the sea, and the air resting above the land becomes hotter than that above the sea. This difference of pressure sets in motion a light breeze which moves from the sea to the land, and is a *sea-breeze*. When night comes the land cools off quicker than the sea, the air over the land is denser, and moves seaward in a *land-breeze* to take the place of the ascending current from the sea.—In the day-time the air warmed on the mountain sides ascends, and a breeze blows up the valley toward the heights. When night comes the cold, heavy air on the mountains flows down as a cool breeze in the valleys.

54. Between the tropics.—Because there are no constant winds there.

55. When hot air rising from the equatorial belt reaches the high part of the atmosphere it divides, one part flowing north and the other south to the belt of high pressure, where they descend to the surface. Here the air divides again, part going toward the poles and part toward the equator. As this air passes into regions where the speed of the earth's rotation increases, instead of flowing straight north and south it is deflected toward the west, becoming on the north side of the equator the north-east trade-winds, and on the south side the south-east trade-winds.—Beyond the trade-wind region, along the belt of high atmospheric pressure, there is a belt of calm and variable winds called the Calms of Cancer on the north side, and on the south side the Calms of Capricorn.

56. A name given to any wind of a markedly seasonal character. —A hot moist wind raising a haze in the air and producing languid sensations is called a *sirocco* in Italy. In Spain it comes across the sea laden with hot dust from the African deserts, and is called a *solano*. The *simoom* appears in Africa and Arabia, a hot suffocating wind, travelling with such violence as to carry clouds of sand for many miles. On the coast of Guinea, during the winter months, a hot wind called the *Harmattan* blows from the interior out to sea.—The office of the wind is the distribution of temperature and moisture.

57. Part of it sinks into the soil, and part flows off and is carried to the sea.

58. Springs are the outflow of water which, sinking into the ground, has met an impervious layer of earth, and collecting above this has formed a sort of reservoir of which the spring is the outlet.

59. Water passes more easily through sand than clay, because sand is more porous.

60. On the northern margin of the Desert of Sahara, on the sandy tracts between Cairo and Suez, in the north of France, near London, and in parts of the United States. Large quantities of water accumulate on impervious beds of earth, and being under pressure, spurt upward when reached by boring.

61. Rain-water absorbs but little of the impurities of the air, and

may be considered nearly pure, while spring water percolating through the ground, gathers up large quantities of mineral matter.

62. From the air.

63. *Hard water* contains a large proportion of mineral matter, while *soft water* contains but a small amount.

64. They contain enough mineral substance to affect the taste of the water.—Springs that contain a large proportion of common salt.

65. Rain-water absorbs carbonic-acid gas, and this gives it a solvent power upon limestone; as the rain sinks through the ground, it dissolves minute quantics of the rock.

66. Rain-water in passing through the chinks and joints in limestone rock dissolves out a portion, and at last forms tunnels and chambers underground.—The trickling of rain through limy substance causes the lime to dissolve, and form a white film which, if undisturbed, lengthens into a stout rod or column. These hanging rods are called *stalactites*. A part of the water drops to the ground and forms a solid column called *stalagmite*.

67. Owing to the unevenness of the land, the surplus rain runs off into hollows, and these hollows or channels which receive and conduct the drainage are watercourses or streams.—Because the surface is sloping, and in obedience to gravity water seeks the lowest level.—Rocks and dense soil make their courses winding.

68. Because of the winding of the stream.

69. A line which divides the flow of brooks and rivers on two opposite sides.

70. Because water evaporates, and there is also less rainfall.—They rise in the snow and ice of the Alps, which melt faster in the summer.—The Nile owes its annual rise to the heavy rainfall of the wet season among the mountains of Abyssinia.

71. Lakes are hollows that have intercepted drainage, and become filled with water.—A lagoon is a sheet of water along the margin of the land, where the ground is low.

72. Having no outlet, the only escape of water is by evaporation, and the saline matter collects, eventually making the lake salt, when it is sometimes called an inland sea.

73. The Caspian Sea is 84 feet lower than the Black. The Dead Sea is 1298 feet lower than the level of the Mediterranean.

74. Rain, by means of the acids it takes from the air, produces chemical action, causing rocks and stones to crumble. The washing away of crumbled particles is the mechanical action. Erosion is the loosening of the particles of earth or rock. As this débris of land and rock is washed away by the rain and brooks, its particles grinding against each other become still further reduced in size, and are then called detritus.

75. They have been cut out by running streams of water.—Round caldron-shaped cavities which have been formed along the walls of

ravines by the grinding of loose stones.—A cañon is a deep gorge or ravine worn between very steep banks by water-courses.

76. Streams when greatly swollen overflow the flat meadows on either side, depositing sediment. Each overflow adds to the height of the deposits, till at last the highest tide is not able to overflow them. The stream then scours a deeper channel, leaving these high deposits as terraces.

77. Because of the sediment conveyed to them by rivers.

78. A delta is generally triangular in shape, its apex pointing up the river. It is formed by the deposit of sediment, where the current is checked by coming in contact with the sea.

79. Particles of water getting in rock-crevices and freezing expand, and thus gradually break up rocks.

80. The name given to the line below which snow melts, but above which more snow falls than the summer months can thaw.—Its height at the equator is from fifteen to twenty thousand feet above the level of the sea, while in the polar regions it comes down to the sea level.

81. Where edges of a snowfield hang over, they break off from time to time, and fall with terrific force down into the valley. These are called avalanches.—Snow constantly falls above the snow-line, and the pressure of the overlying mass forces the air out of the underlying portion, causing it to pass into clear blue ice.—Where there is a slight inclination, the action of gravity causes the glacier to move downward.

82. The heaps of stone, earth, and gravel which the glaciers carry along with them are called moraines. When they are on the side of the glacier, they are called *lateral* moraines; when in the center, *medial;* when at the end where the glacier melts, *terminal.*—Coming in contact with warmer temperature, it melts, forming the source of rivers.

83. The entire body of salt water surrounding the continent.—About one fourth land and three fourths water.—The south side.

84. The depressed parts of the earth's surface.

85. An ocean is the largest division of the sea. The Atlantic.

86. Rain-water, because of the carbonic-acid gas it has absorbed, dissolves out of the soil saline substances which are carried by rivers to the sea. Their continual accumulation has given the sea its saltness.—Carbonate of lime and silica.

87. By sounding in deep parts and dredging in shallow parts.

88. They are submarine banks of a kind of limestone, formed entirely by the growth of coral polypes.

89. It is organic matter which serves the simpler forms of marine creatures as food.

90. It is warmer.

91. Icebergs are floating masses of ice. They break off from

glaciers in the Arctic regions as the glaciers push into the sea.—An ice-floe is the freezing of the surface-water of the sea during the intense cold of the polar regions.—An ice-foot is a shelf of ice frozen to the shore and lifted by the tide from twenty to thirty feet above the level of an ice-floe. Ground ice is the freezing of the water lying on the sea-bottom.

92. The rise and fall of the waters of the ocean are called tides. The falling of the water is ebb tide, and the rising, flood tide. High-water is the highest mark reached by flood-tide, and low-water the lowest mark to which ebb tide falls. The tide rises for about six hours, and falls for the next six hours. About fifty minutes later each day.

93. The highest rise and lowest fall of the tide are *spring-tides*. The least rise and fall are *neap-tides*.

94. The attraction of the sun and moon cause two tidal-waves, or a heaping up of the water, to pass around the earth from east to west nearly twelve and one half hours apart. The moon's influence is about three times as great as the sun's.

95. In the middle of the Pacific it is less than a foot. In the Atlantic, about three feet.

96. Both the Bay of Fundy and the Bristol Channel have a broad mouth which gradually narrows. This narrowing of the land acts like a funnel, forcing the tidal-wave higher and higher as it moves up the channel.

97. The meeting in narrow passages of two opposing currents, or the striking of the tide in these passages against sunken rocks, form whirlpools.

98. At the southern end of Lofodden Islands, on the Norwegian coast.

99. Waves are formed by the friction of the wind.—Broad undulations coming in upon the coast from storm areas, out at sea.

100. The regular and constant circulation of parts of the sea. The main cause is the difference of temperature between the polar and tropical regions, which acts directly on the waters, and acts indirectly by the winds. The cold and heavier water from the polar regions flows south, and displaces the lighter and warmer water of the tropical regions. These currents are modified in their natural course by the rotation of the earth.

101. The trade-winds set the surface-water of the sea in motion so that it acquires a gradual tendency toward the equator. Uniting at the equatorial belt, it assumes a westerly direction, crossing the Atlantic and Pacific as the equatorial current. Owing to the interference of the continents, it separates at Cape St. Roque, the larger current sweeping round into the Carribbean Sea and Gulf of Mexico, whence it issues as the Gulf Stream; the smaller current turning southward as the Brazilian current.—In the Pacific Ocean the equatorial current divides at the Malay Archipelago, one branch

turning northward as the Japan current.—The Labrador current is a current of cold water descending from Davis Strait, along the coast of Labrador.

102. The country near which the warm currents pass is made warmer, while the polar currents make climate colder.

103. A vast area of comparatively still water in the Atlantic Ocean, over the surface of which dense masses of sea-weed grow.

104. A continent is one of the six great divisions of land.—The line from which the ground slopes on either side to the sea.

105. A connected series of mountains.—Two or more mountain ranges running parallel with each other are a mountain chain or system.

106. Soil is the upper layer of earth or mould which furnishes nutriment to plants.—Sandstone, shale, slate, limestone, chalk, granite.

107. The temperature increases at an average of 1° Fahr. for every sixty feet of descent. Geysers are boiling springs whose waters burst out at intervals with great force.

108. That it is a heated mass of material in a solid state.—The statement that it is a "molten mass" conveys no idea of solidity.

109. Any conical mound or mountain formed of materials which have been erupted from beneath the surface.—A basin-shaped opening at the top.

110. This eruption buried the cities of Herculaneum, Pompeii, and Stabiae. For twelve or fifteen miles around the air was dark as midnight, and a thick deposit of fine ashes and stones covered the whole district.

111. Fine dust, ashes, steam, stones, lava, and gases.

112. About 173.—They are all ranged close to some one of the great ocean basins.

113. Tremblings or concussions of the ground.—The city of Lisbon sank, and 60,000 people were destroyed.—A generation later the Calabrian earthquake destroyed not less than 40,000.

114. Rents in buildings show in what direction the shock came. By noting where the shock was vertical and where oblique, and measuring the angle these two lines make, the depth has been calculated.

115. Any elevation of the ground after an earthquake is called an upheaval. Any depression below the previous level, a subsidence.

116. A fringing reef is a coral formation skirting the margin of the land at a distance of one or two miles, with shallow water intervening.—A barrier reef is one farther from the shore, having deeper water intervening and deeper water outside.—An atoll is a ring of coral rising out of the middle of a deep ocean inclosing a body of comparatively shallow water.

117. Climate is the general temperature, moisture, winds, and

other atmospheric conditions which prevail in any place —Distance from the equator, distance from the sea, height above the sea, prevailing winds, and the nature of the soil.

118. By *flora* is meant the vegetation, and by *fauna*, the animals of the region.

119. The fauna of Australia is the most peculiar found anywhere on the globe. None of the domestic animals, nor any of the well-known beasts of prey, are found there.

120. The primary races are the Caucasian, the Mongolian, and the Negro ; the secondary races are the Malay or Brown race, the Australian, and the American or Copper-colored race—these last being regarded as modifications of the Mongolian race.

CHAPTER XIV.

ENGLISH LITERATURE.

For First Grade.

1. Name and describe three English literary productions previous to the time of Chaucer.
2. What influence had Alfred upon literature?
3. Give a short sketch of the life of Chaucer.
4. Name his greatest work, and sketch briefly its plan.
5. What famous Italian poets lived in Chaucer's time?
6. Who was Sir John Mandeville?
7. Who was called the Morning Star of the Reformation?
8. Of what benefit was William Caxton to English literature?
9. What reason is there for associating Wyclif and Tyndale?
10. What can you say of Utopia and its author?
11. Describe the "Miracle Plays" and the "Moralities."
12. Give the points of interest in the life of Spencer and name his principal works.
13. For what are these men noted: Ascham? Sidney? Hooker? Raleigh?
14. Sketch the rise of the drama, bringing it down to the time of Shakespeare.
15. Tell the chief facts in Shakespeare's life.
16. Name ten of his dramas.

17. In what has Shakespeare excelled all other writers?

18. Name the celebrated contemporaries of Shakespeare.

19. Of whom was it said, "The wisest, brightest, meanest of mankind," and who said it? Was it just?

20. What is meant by the Shakespearean-Bacon controversy?

21. What gives Bacon his great place in English literature?

22. What was the chief influence of his works?

23. Distinguish between the *inductive* and *deductive* mode of reasoning.

24. By whom was the Authorized Version of the Bible made? At what time?

25. Give a short account of the translations that preceded it.

26. Name a work by each of the following: Izaak Walton, Jeremy Taylor, Samuel Butler.

27. Give an account of the life and writings of John Bunyan.

28. When was the golden age of English literature?

29. Into what three periods does the life of Milton naturally divide itself?

30. Name the works he wrote in each period.

31. When were the theatres closed, and for how long?

32. When were actresses, movable scenery, and the ballet brought upon the stage?

33. What was the corrupt drama?

34. When did Dryden live? Name his chief works.

35. Name the three unities.

36. Name four of the corrupt dramatists.

37. What was the Augustan Age of English literature?

38. In what fields of investigation were Locke and Newton interested?

39. Who was Dean Swift, and for what noted?

40. How is his name coupled with "Stella" and "Vanessa"?

41. Addison and Steele. Give a short sketch of their lives, the papers they established and for which they wrote.

42. What is the acknowledged estimate of Addison's style?

43. Contrast Dr. Johnson and Alexander Pope as to their personal appearance and individual traits of character.

44. Name the principal works of each.

45. Tabulate the early novelists and their works according to the time each appeared.

46. Who was James Boswell?

47. Sketch briefly Goldsmith's life, name his works, and give some account of "The Deserted Village."

48. What is meant by "Grub Street"?

49. Name three great historians of the 18th century, and the important works of each.

50. Who were the literary impostors?

51. Name the author of each of the following: Essays of Elia; The Task; The Seasons; Elegy in a Country Churchyard; The Wealth of Nations; The Bridge of Sighs; Aurora Leigh.

52. Compare Byron and Burns, showing wherein their lives were alike and wherein different.

53. Have you pity or blame for them?

54. Name the principal works of each.

55. Who were the so-called "Lake-school poets"? Why so called?

56. Mention an important poem by each.

57. Who was the "Magician of the North"?

58. Give an account of his life and name ten of his works.

59. Mention three leading English historians and two

American historians of the nineteenth century; also a leading work of each.

60. Mention five modern English novelists, and one novel written by each.

61. Name one poem of Shelley's. One of Keats'.

62. Where will you find literary reference to Rebecca, Gulliver, Man Friday, Wayland Smith, The Tabard Inn, "Barkis is willin'", Dr. Primrose?

63. What is characteristic of the writings of Thackeray and of Dickens?

64. Name the principal works of each.

65. Who wrote the following: Hiawatha? Fable for the Critics? Maud Muller? Autocrat of the Breakfast Table? Thanatopsis? Uncle Tom's Cabin?

66. Fill up these blanks:

Snow-Bound, by.....

....., by Edgar Allan Poe.

Walden, by.....

....., by Hawthorne.

The Battle-Hymn of the Republic, by .....

The Spy, by.....

....., by Bayard Taylor.

67. Name the principal writings of Irving.

68. Name ten of Cooper's works.

69. Name five qualities in the Legend of Rip Van Winkle that render it well suited for dramatizing.

70. Name one work by each of the following: Charlotte Brontë, Bulwer, Charles Kingsley, George MacDonald.

71. Give a sketch of Tennyson's life, and name ten of his best poems.

72. Name in the order of merit the four ablest American writers of fiction.

73. Name the writers who used the following *nom-de-*

plumes, and a work by each: Geoffrey Crayon, Ik Marvel, Hosea Biglow, Artemus Ward, Timothy Titcomb.

74. Name three works by each of the following: Whittier, Longfellow, George Eliot, Carlyle.

75. Who wrote Louisiana? Daisy Miller? The Rise of Silas Lapham? Haworth's? Old Creole Days? Washington Square? Ben Hur?

76. Name the two most noted American literary periodicals.

ANSWERS TO ENGLISH LITERATURE, FIRST GRADE.

1. Beowulf, Caedmon's Paraphrase of the Scriptures, and the Anglo-Saxon Chronicle. Beowulf is an epic poem of more than six thousand lines. It was composed by the Saxons before they invaded England, and recounts the great deeds and death of a hero named Beowulf, who slew the monster Grendel. The poem is supposed to be allegorical, the monster representing the poisonous vapors from the marshes. Caedmon's Paraphrase of the Scriptures is a religious poem, in which he sang the creation of the world, the history of Israel, the book of Daniel, and the whole story of the life of Christ and of future judgment. It is told that one night in a dream a strange figure appeared to Caedmon and bade him sing of the creation. At once he became inspired, and the words of his song remained in his memory after he awoke. He died in 680. The Anglo Saxon Chronicle, supposed to have been composed at the suggestion of King Alfred, began with the arrival of Cæsar in Britain, and was continued as a record to the accession of Henry II. It is written in prose, and furnishes valuable and trustworthy facts concerning the early history of the English people.

2. King Alfred did much to free his people from ignorance. He secured high education to the clergy, and had the standard writings on religion, morals, and history translated into the language of the people. He translated many works himself, criticising the text as he saw fit. His writings are pronounced the purest specimens of Anglo-Saxon prose.

3. Geoffrey Chaucer was born in London in 1340. It is supposed that he studied at either Oxford or Cambridge. In 1359 he was made prisoner by the French, but a year later was ransomed and returned to England. Later he became connected with the court, and married one of the queen's maids of honor. In 1373 he went to Italy, and is supposed to have met Petrarch and Boccaccio. He was elected to Parliament from Kent in 1386. He died in 1400.

4. The Canterbury Tales. A series of tales in which, after a brief description of spring, the poet says that being about to make a pilgrimage from London to the shrine of Thomas à Becket in the cathedral of Canterbury, he passes the night at an inn in Southwark. Here he meets many pilgrims on their way to the same shrine. Chaucer imagines each of them telling a tale. These tales give us an accurate idea of persons of different rank and occupation.

5. Petrarch and Boccaccio.

6. Sir John Mandeville was the first writer of English prose. He published a volume of travels in 1356. Its popularity is proved by the fact that many copies of it circulated in manuscript.

7. John Wyclif.

8. He first introduced the art of printing into England. He translated several works, and in all printed about sixty-four books, among which were the productions of Chaucer, Lydgate, and Gower.

9. Wyclif made the first translation of the Bible, and Tyndale made the second.

10. Sir Thomas More was one of the ablest men of his age in all Europe. He was the friend of Erasmus, and was appointed successor of Wolsey by Henry VIII. He was beheaded in 1535 because he would not recognize the validity of Henry's marriage with Anne Boleyn. Utopia is his most famous work, and is a picture of an imaginary commonwealth, in describing which he finds opportunity for giving his views upon various social and political questions, as education, the oppression of the poor, etc. It was written in Latin and translated into English.

11. The miracle plays or mysteries, given in cathedrals and churches, represented in a rude dramatic form legends of the lives of saints and striking scenes of Bible history. These plays began about 1100, and were employed by the clergy to give religious instruction to the people, to strengthen the influence of the church, and to amuse rude hearers. The performances were popular to the end of the 14th century. They were supplanted by the moralities, a kind of drama which, instead of being purely religious, was moral as implied by the name. Instead of saints, patriarchs, and angels, the characters who figure in the moralities were the virtues and the vices, with the addition afterwards of allegorical personages, such as riches, good deeds, confession, death. These plays died out about the end of Elizabeth's reign.

12. He was born in London in 1552, and educated at Cambridge. After leaving the university, he became a tutor in Lancashire. In 1578 he returned to London, and was introduced to Sir Philip Sidney and the Earl of Leicester, who took the poet under their patronage. Next year appeared his "Shepherd's Calendar." In 1580 Spenser received an appointment in Ireland. A grant of confiscated land was given him not far from Cork, where he resided, far removed from society and strongly hated by the Irish. While in Ireland he wrote the "Faerie Queen." During the Irish rebellion of 1598 his castle was sacked and burned, and one of his children perished in the flames. He fled to England with his household, and died in London in 1599, in destitute circumstances. His principal works are "The Shepherd's Calendar" and "The Faerie Queen."

13. Ascham wrote "Toxophilus," and later, when tutor to Queen Elizabeth, he wrote "The Schoolmaster."—Sir Philip Sidney wrote "Arcadia," a romance patterned after the Spanish romances. He also wrote the "Defence of Poetrie," which was in the form of a criticism.—Richard Hooker wrote four books on "The Laws of Ecclesiastical Polity," a defence of the Church against the Puritans. —Sir Walter Raleigh, during his imprisonment, wrote the "History of the World."

14. The regular drama had its beginnings in the Miracle Plays and Moralities, spoken of in answer to the 11th question. The virtues and vices at length proved dull because they stirred no human sympathy. Historical characters were therefore introduced which represented a virtue or a vice. Brutus represented patriotism; Aristides, justice, etc. When the religious struggle of the Reformation came, men were not satisfied with subjects drawn from the past, and the Morality was taken advantage of by Catholics and by Protestants to enforce their several views. The stage was now becoming a living power. People, through this excitement, grew tired of the virtues and vices, and a demand arose for a comedy and tragedy that should picture human life in all its phases. The first English comedy—*Ralph Roister Doister*—was written by Nicholas Udall, and enacted in 1551. It is divided into regular acts and scenes, and is written in rhyme. The first English tragedy—*Gorboduc*—was enacted in 1562. After this follows several plays by different writers. These plays were performed in town-halls, court-yards of inns, and in noblemen's dining-halls. In 1576 the first theatre, "Blackfriars," was built. Two others, "The Theatre" and "The Curtain," were set up in the same year. The theatres were in the form of a hexagon outside and circular within. They were open to the weather except above the stage. The play began at three o'clock; the nobles and ladies sat on the stage; the people stood in the pit or yard. Wooden imitations of towers, woods, etc., were all the scenery used, and a placard stating the place of action was hung up when the scene changed. The female parts were acted by boys. Between 1580 and 1596 we find plays by Lyly, Peele, Greene, Marlowe, Kyd, and the earliest works of Shakespeare.

15. He was born at Stratford-on-Avon in 1564. He was sent to the grammar-school of his native town, but was probably withdrawn in his fourteenth year. At eighteen he married Anne Hathaway, who was eight years the elder. Three years after his marriage he left his wife and family and went up to London to seek his fortune. There he entered a dramatic company, becoming an actor and also a rewriter of plays. He rose steadily, becoming in a few years the most successful manager, and standing, moreover, foremost in the rank of literary men. His death occurred in 1616.

16. Hamlet, King Lear, Macbeth, Julius Cæsar, Richard III., The Merchant of Venice, Romeo and Juliet, Much Ado About Nothing, As You Like It, and Othello.

17. In his knowledge of human nature; in the imagination he shows in portraying character; in the power to hide his own individuality.

18. Edmund Spencer, Christopher Marlowe, Robert Greene, Ben Jonson, Beaumont and Fletcher, Francis Bacon, Sir Walter Raleigh.

19. It was said of Francis Bacon. By Pope. It was not.

20. It was a controversy in which certain writers claimed that the plays of Shakespeare were written by Francis Bacon.

21. His writings in philosophy, and his essays, which stand among the most finished works of pure English.

22. They directed attention to the great value of the inductive system of investigation as a means of ascertaining scientific truth.

23. Inductive reasoning begins by collecting facts, classifying them according to their agreement and difference, and gradually gathering from them laws of greater and greater generality. Deductive reasoning consists in combining two or more general truths and thus reaching a conclusion which is a truth less general than the other two; or, in other words, that applies to fewer individual instances than the truths from which it was inferred.

24. By a body of 47 divines during the years 1607-1611.

25. John Wyclif made the first translation of the Bible about 1380. In 1525 Tyndale translated the New Testament. Miles Coverdale, Bishop of Exeter, made a translation of the Bible in 1535. Cranmer's Bible appeared in 1540.

26. "The Complete Angler."—"Holy Living and Dying."—"Hudibras."

27. John Bunyan was the son of a poor tinker. He married a devout woman, and through her influence became converted. Because of his religious belief he suffered imprisonment for twelve years, during which time he wrote the first part of "Pilgrim's Progress." He also wrote a religious autobiography called "Grace Abounding to the Chief of Sinners," and "The Holy War."

28. During the time of Elizabeth.

29. Milton's literary career divides itself into three great periods—that of his youth, his manhood, and his old age. The first may be said to extend from 1623 to 1640; the second, from 1640 to 1660, the date of the Restoration; the third, from the Restoration to the poet's death in 1674.

30. In the first period, "Hymn on the Nativity," "L'Allegro," "Il Penseroso," "Comus, the Arcades and Lycidas;" the second period, his pamphlets and "State Papers;" the third period, "Paradise Lost," "Paradise Regained," "Samson Agonistes."

31. From 1642 to 1660.

32. In 1660, when the theatres were reopened at the time of the Restoration.

33. When the theatres were opened after the Restoration, society was very corrupt, and the plays—mostly comedies—written to amuse the immoral public, constitute what is termed "The Corrupt Drama."

34. Dryden lived from 1631 to 1700. His chief works were "Annus Mirabilis," "Absalom and Achitophel," "The Hind and Panther," a translation of the Æneid, "Alexander's Feast, or Ode to St. Cecelia."

35. In a Grecian drama three rules were carefully observed: first, that there should be a distinct plot to which all minor parts should

contribute, or unity of action; second, that the incidents of the play should naturally come within one day, or unity of time; third, that the entire action should occur in one place, or unity of place. Ben Jonson sought to observe these unities.

36. Dryden, William Wycherley, William Congreve, Sir John Vanbrugh.

37. The epoch of literature immediately following the time of Dryden. It lasted into the reign of George I.

38. Locke, in "Metaphysics," and Newton, in "Astronomy and Natural Philosophy."

39. Jonathan Swift was born in Dublin in 1667. He was educated at Trinity College, and afterwards was private secretary to Sir William Temple. In 1700 he was made a clergyman. He was a great politician, being at first a Whig, but later he became a Tory. While Dean of St. Patrick's, Dublin, he wrote his famous "Drapier's Letters," and other able political pamphlets. The most noted of his prose works is Gulliver's Travels.

40. Stella and Venessa are fictitious names which Swift gave to two women, both of whom he professed to love. Venessa died broken-hearted, and, though Swift probably married Stella, he never publicly recognized her as his wife.

41. Addison was the son of an English clergyman, while Steele was of Irish parentage. Their friendship began in their school-days. Steele's earliest works were "The Christian Hero," and several comedies. In 1709 he published a small paper called the *Tattler*. It was issued three times a week, and served the double purpose of supplying news as well as a series of brief essays on life, literature, or any other entertaining topic. After this came the *Spectator*, which was to be altogether literary in its character. This paper was published daily. Two years later he began the publication of a daily periodical called *The Guardian*, which continued about eight months. Addison contributed largely to all these papers, and his name is inseparably connected with the *Spectator*. In 1713 Addison wrote Cato, a tragedy, which was acted at Drury Lane Theatre four years later. He died at the age of 47.

42. It was long regarded as the finest model of elegant yet idiomatic English prose.

43. Johnson possessed a massive bodily frame and great muscular strength. Pope was a man of dwarfish stature, being deformed and weakly from birth. Johnson was gross and offensive in his manners, careless and slovenly in dress. Pope's manners were elegant, and he was vain and fastidious in dress. Johnson, though outwardly harsh, possessed great tenderness of heart, was generous, independent, invincible; Pope was narrow and conceited, and craved admiration.

44. Johnson's: A Dictionary of the English Language; The Vanity of Human Wishes; Rasselas, Prince of Abyssinia; The

Lives of the Poets. Pope's: The Essay on Criticism; The Rape of the Lock; Windsor Forest; A Translation of the Iliad and the Odyssey; The Dunciad; The Essay on Man; Imitations of Horace.

45. Daniel Defoe, Robinson Crusoe, 1719.

Samuel Richardson: Pamela, 1741. Clarissa Harlowe, 1749. Sir Charles Grandison, 1753.

Henry Fielding: Joseph Andrews, 1742. Tom Jones, 1749. Amelia, 1751.

Tobias Smollett: Roderick Random, 1748. Peregrine Pickle, 1751. Humphrey Clinker, 1771.

Laurence Sterne: Tristram Shandy, 1761. Sentimental Journey, 1768.

46. The biographer of Dr. Samuel Johnson.

47. Oliver Goldsmith was born in Ireland in 1728. When seventeen years old he obtained a servant's scholarship at the University of Dublin. In 1755–6 he travelled on foot from England to Italy, playing his flute to gain food and lodging. While thus wandering, he sketched the plan of the Traveller. In 1756 he returned to England, and during the next eight years wrote Letters from a Citizen of the World, Life of Beau Nash, and a History of England. In 1766 The Vicar of Wakefield appeared. This was followed by The Good-natured Man, The Deserted Village, She Stoops to Conquer, and the History of Animated Nature. The Deserted Village is his finest poem. In it he pictures chiefly the landscapes and characters of Lissoy, of which his father was pastor. He calls the village Auburn, but tells us it was the seat of his youth, every spot of which was dear and familiar to him. He describes the pastor, the schoolmaster, the ale-house, and tells of the luxury that has killed all the simple pleasures of village life.

48. A name which was given to the place where hack writers were said to live. The term now used is Bohemia.

49. David Hume, History of England; Edward Gibbon, The Decline and Fall of the Roman Empire; William Robertson, History of Scotland during the Reigns of Queen Mary and James VI.

50. Macpherson, Chatterton, and Ireland.

51. Charles Lamb, Cowper, Thomson, Gray, Adam Smith, Thomas Hood, Elizabeth Barrett Browning.

52. Byron was born to rank and fortune, Burns to abject poverty and drudgery. Byron had all the advantages of education, while Burns was self-taught. Byron about his twenty-first year came suddenly into fame; Burns, not until near his thirtieth, and then slowly. Both drank heavily, and undermined their constitutions. Byron was a libertine, Burns was incontinent. Both died early.

53. [Answer left for the student.]

54. Burns': The Cotter's Saturday Night, The Twa Dogs, Tam o' Shanter, To Mary in Heaven, A Man's a Man for a' that, Jolly Beggars. Byron's: Childe Harold, Don Juan, Giaour, Bride of Abydos, Prisoner of Chillon, The Corsair, Lara.

55. William Wordsworth, Samuel T. Coleridge, Robert Southey. Because they dwelt about the lakes of Cumberland.

56. The Excursion, by Wordsworth; The Ancient Mariner, by Coleridge; Roderick, the Last of the Goths, by Southey.

57. Sir Walter Scott.

58. Walter Scott was born at Edinburgh, in August, 1771. He was educated at the University of Edinburgh. He studied law in his father's office, and in 1792 was admitted to the bar. Four years later he first appeared before the public as a translator, and from that time his fame steadily increased Scott married a Miss Carpenter, a lady of small fortune. In 1812 he removed to Abbotsford, where he built a fine mansion. In the financial crisis of 1825 he became bankrupt. By hard literary work he paid off his debts, but ruined his health, and was induced to make a voyage to the Continent. He returned the next year, and died at Abbotsford, in September, 1832. The Lay of the Last Minstrel, The Lady of the Lake, Marmion, Ivanhoe, Kenilworth, Quentin Durward, The Talisman, Woodstock, The Bride of Lammermoor, The Heart of Midlothian.

59. Thomas B. Macaulay, History of England; James A. Froude, History of England; Edward A. Freeman, History of the Norman Conquest; William H. Prescott, Conquest of Mexico; George Bancroft, History of the United States.

60. Bulwer Lytton, The Last Days of Pompeii; Charlotte Brontë, Jane Eyre; Charles Reade, Hard Cash; Anthony Trollope, Framley Parsonage; William Black, A Princess of Thule.

61. Ode to a Skylark; Ode to a Grecian Urn.

62. Ivanhoe, Dean Swift's Gulliver's Travels, Robinson Crusoe, Kenilworth, Canterbury Tales, David Copperfield, Vicar of Wakefield.

63. Thackeray deals with life in high society; Dickens with that of low society. Thackeray expresses strong dislike against false pretences and sham sentiments; Dickens' writings are generally humorous or pathetic.

64. Of Thackeray: Vanity Fair, Pendennis, Henry Esmond, The Virginians, The Newcomes. Of Dickens: Nicholas Nickleby, Oliver Twist, The Old Curiosity Shop, Barnaby Rudge, Dombey and Son, David Copperfield, Christmas Stories.

65. Longfellow, Lowell, Whittier, O. W. Holmes, Bryant, Mrs. Stowe.

66. Snow-Bound, by John G. Whittier.
The Raven, by Edgar Allan Poe.
Walden, by Henry Thoreau.

The Scarlet Letter, by Nathaniel Hawthorne.
The Battle Hymn of the Republic, by Julia Ward Howe.
The Spy, by James Fenimore Cooper.
El Dorado, by Bayard Taylor.

67. Salmagundi, Sketch-Book, Diedrich Knickerbocker's History of New York, Tales of a Traveller, Life of Columbus, Life of Washington, Life of Mohammed, Bracebridge Hall.

68. The Spy, The Deerslayer, The Pathfinder, The Pioneer, The Last of the Mohicans, The Pilot, Red Rover, Water Witch, The Prairie, Wept of the Wish-ton-Wish.

69. The scenery would be beautiful, because the plot is laid in the Catskills ; there is a variety of characters ; the legend is humorous, and also very pathetic ; one's sympathy is strongly appealed to.

70. Shirley, The Caxtons, Hypatia, Robert Falconer.

71. Alfred Tennyson was born at Somersby in 1809. While at school, he and his brother Charles made a volume of poems which was published under the title of "Poems by Two Brothers." At Cambridge in 1828, Tennyson gained the Chancellor's prize for a poem on "Timbuctoo." The first enthusiastic reception of his poems was a volume published in 1842. In 1850, on the death of Wordsworth, Tennyson was made Poet Laureate. Of his best known works are, In Memoriam, The Princess Maud, Idylls of the King, Enoch Arden, The Holy Grail, Queen Mary, Harold, The May Queen, The Charge of the Light Brigade.

72. Hawthorne, Mrs. Stowe, Mrs. Burnett, W. D. Howells.

73. Washington Irving, "Bracebridge Hall ;" Donald G. Mitchell, "Reveries of a Bachelor ;" James Russell Lowell, "Among my Books ;" Charles F. Browne, "The Letters of Artemus Ward ," Dr. J. G. Holland, "Gold Foil."

74. By Whittier: Snow-Bound, The Tent on the Beach, Skipper Ireson's Ride. By Longfellow: Evangeline, The Courtship of Miles Standish, Tales of a Wayside Inn. By George Eliot: Scenes of Clerical Life, Adam Bede, Middlemarch. By Carlyle: Sartor Resartus, Letters and Speeches of Oliver Cromwell, Life of Frederick the Great.

75. Mrs. Burnett ; Henry James ; William D. Howells ; Mrs. Burnett ; George W. Cable ; Henry James ; Gen. Lew Wallace.

76. The Century and Harper's Monthly Magazine.

CHAPTER XV.

THEORY AND PRACTICE OF TEACHING.

For Third Grade.

1. Make out a daily programme for your grade. Give reasons for the order of the subjects and for the length of time assigned to each subject.

2. Describe the "word method" and the "phonic method" of teaching reading. State the several reasons that may be adduced for and against each method.

3. In teaching reading, state which you regard the better method—printing the words or using script, giving reasons for your answer.

4. Is there any objection in using both print and script in the first lessons in reading?

5. Which is better in teaching reading—blackboard and crayon, or the chart and printed book, and why?

6. What words would you use in these early lessons in reading?

7. What is reading according to Colonel Parker's *dictum?*

8. Give your method of conducting a recitation in the Second Reader, including the assigning of the next lesson and the instructions for the preparation of it.

9. What attention would you give to spelling in the child's first year at school?

10. To what extent should the separation of words into syllables be used in teaching spelling?

11. In teaching number, would you teach the four fundamental principles at the same time or one after another?

12. What distinction would you make between learning number and learning the language of number?

13. At what stage should the use of objects in teaching number be discontinued?

14. Write out your method of teaching common fractions.

15. Write out your method of teaching division of decimals.

16. Has unwritten or "mental" arithmetic any advantages of written arithmetic? Support your answer with full reasons.

17. Give an outline of your plan with beginners in geography.

18. What advantages and disadvantages has moulding in teaching geography?

19. In what respects do you think map-drawing is of advantage?

20. What use would you make of objects and products in teaching geography?

21. Make a topical outline for teaching the continents.

22. In elementary geography would you, after teaching the locality, go to the county and then to the State, and from there to the United States, or would you take up the globe and from that go to the continents, and from North America to the United States? Give reasons for the plan you favor.

23. How would you use the knowledge gained from weather observations as a basis for teaching climate?

24. In teaching United States History to a class whose average age is twelve years, would you use the topical or question method, and why?

25. What use would you make of maps and drawing?

26. Outline two consecutive lessons for a class just beginning grammar. State what knowledge you assume the pupils to have and upon which you base your instruction.

27. Do you regard the analysis of sentences or parsing the more important, and why?

28. What advantages is it claimed result to pupils from the use of the vertical hand in penmanship? What disadvantages result from the use of the sloping hand?

29. How would you conduct examinations, and of what should these be a test?

30. State several ways in which you would keep first- and second-year pupils busy at their seats.

31. Lay out a plan of work for the first day in your new school.

32. Would you allow your pupils to choose their own seats?

33. From what direction, with reference to pupils when in their seats, should light enter a schoolroom? Why?

34. At what temperature should the air of a schoolroom be kept? Why should attention be paid to the humidity of schoolroom air?

35. How would you control whispering? How would you prevent tardiness?

36. What do you understand by the "pouring-in" process?

37. Who was Pestalozzi? Who was Froebel?

38. Give an illustration of the application of the principle "from the concrete to the abstract" in the teaching of geography. In the teaching of fractions.

39. To what extent is the teacher culpable if the ventilation of the schoolroom is not good?

40. Name seven school virtues. Seven school vices.

41. State in what ways you would make the school in itself attractive?

42. To what extent would you require apologies from pupils for misconduct?

43. What moral qualities should the teacher try to cultivate in his pupils?

44. What do you understand by Fitch's statement that "nothing influences character like character"?

45. What daily preparation for work do you regard necessary?

Second Grade.

1.* What distinction is there between the knowledge to the teacher and the knowledge to the pupil of any subject taught?

2. What is Payne's view of the main business of the teacher?

3. With what arguments does he support this principle?

4. What does Payne mean by saying that learning is the process by which the child teaches himself?

5. What objections does Payne make to long explanations?

6. What would you do when pupils did not understand the definitions given them to learn?

7. Discuss each of these six points on Nature's way of teaching, and tell how far they should be followed and how modified by the teacher:

(1) Nature's teaching is desultory.

(2) Nature's teaching is often inaccurate.

(3) Nature's teaching often appears to be overdone.

(4) Nature's teaching does not secure the results of her lessons with a direct aim to mental and moral improvement.

(5) Nature accustoms her pupils to little, and that the simplest, generalization.

* These questions as far as the nineteenth are based upon Payne's Lectures on Education.

(6) Nature is relentless in her discipline.

8. What is method in teaching?

9. What is meant by the art of teaching?

10. What principle does Payne say underlies the "best method of teaching"?

11. What are the fundamental elements of all knowledge?

12. What relation exists between sensations, perceptions, and conceptions?

13. What is memory?

14. What is the art of memory?

15. Name the processes ideas are subjected to by the mind.

16. What is education according to Payne?

17. State the most important of the educational principles of Pestalozzi.

18. State the most marked principles of Froebel's educational practice.

19. What advantages are there in a well-prepared programme?

20. What is the difference between a descriptive method of teaching a subject and the method of development? In what subjects is the one to be preferred to the other?

21. State what application you would make in your teaching of the educational maxim, "Learn to do by doing"?

22. What is the aim and object of nature study?

23. In beginning the subject of grammar, do you first instruct pupils in the parts of speech, or in the elements and construction of sentences?

24. What are leading questions, and is there any objection to them?

25. Mention two ways by which a pupil is benefited by a recitation.

26. What are suggestive questions? Is there any objection to the use of them?

27. Name three proper incentives to study.

28. State the principal means by which the teacher exercises educational influences upon the child.

29. Should a teacher reject partial answers? Reason for your answer.

30. Would you have what are called "whispering recesses"? Reasons for your answer.

31. What method do you pursue in assigning lessons?

32. Mention some good qualities in any of your teachers that have assisted in moulding your character.

33. Would you use the terms "carry" and "borrow" in addition and subtraction?

34. Write an outline of your plan for teaching numeration and notation.

35. Repeating answers is a habit often acquired in teaching: why is it to be condemned?

36. What can be said in defence of it?

37. For what reasons is private reproof or correction preferable to public?

38. What are the hygienic reasons for adjustable seats and desks?

39. In what ways can a teacher promote the health and physical culture of his pupils?

40. What advantages are there in having a recess, in which pupils may engage in play, in the middle of the morning and afternoon school sessions?

41. Can you state what abnormal anatomical growths frequently cause dulness?

42. Make a list of the most common faults of children, and set forth a plan of correction.

43. In what ways can a teacher promote the development of moral character among his pupils?

For First Grade.

1. Illustrate by examples the presentation of some subject analytically and synthetically.

2. Give examples illustrating the meaning of the following: "Ideas before words"; "Go from the known to the unknown"; "One thing at a time."

3. Do you believe this principle is correct: synthesis first and then analysis? Give reasons for your answer.

4. Name two of the most noteworthy recent improvements in primary instruction.

5. Should questions be answered in complete sentences? To what extent, and why?

6. If you were illustrating addition of fractions to your class, and should be asked by one of its members why the denominators were not added as well as the numerators, how would you explain?

7. What is meant by a development lesson?

8. Mention the faculties in the child's mind in the natural order of their development.

9. Distinguish between intellectual power and knowledge.

10. Between knowledge and culture.

11. Contrast the judgment of a child with that of an adult, and state what in general makes the difference.

12. What difference is there between perception on the part of a child and perception on the part of an adult?

13. What advantages does class instruction for a pupil possess over individual instruction? What disadvantages?

14. State and explain as fully as possible the most fundamental principle of education.

15. When should science teaching begin, giving reasons for your answer?

16. Can all children be made investigators, or are rou-

tine methods sometimes necessary? Give reasons for your answer, founded upon your own observation and study of pupils' minds.

17. In your judgment, what limitations has oral instruction?

18. What plan would you pursue in teaching a child under twelve years of age English?

19. What is attention? How may it be secured?

20. Define the terms objective and subjective.

21, What is meant by the association of ideas?

22. Distinguish between the creative and the reproductive imagination. Show the importance of the latter in the work of education, and how you would cultivate it.

23. What is the distinction between inductive reasoning and deductive reasoning?

24. Distinguish between memory and imagination.

25. Explain what is meant by *apperception.*

26. Set forth a method of teaching percentage that would provide for easy apperception on the part of the pupil. Can you, in contrast to this, set forth a method in which apperception would be difficult?

27. What is meant by *interest* with reference to schoolroom instruction? State several ways for arousing and sustaining interest.

28. Explain what is meant by the correlation of studies, and give illustrations.

29. What is meant by the educational value of studies?

30. Distinguish between formal studies and content studies.

31. What ends are to be subserved in teaching literature in the grammar grades?

32. Select any literary production suitable for a grammar grade, state what would be your aim in teaching it, and set forth your method for realizing that aim.

33. Considering the public school as an institution, state

what its purposes are and how these purposes may best be realized.

34. What objections are there to promotion of pupils but once a year?

35. What objections are there to the promotion of pupils every six months?

36. What advantages are there in individual promotion of pupils?

37. Can you describe a plan used in any system of schools whereby pupils may be promoted according to their ability to do the work required by the course of study of each grade?

38. Explain what is meant by *in loco parentis.*

39. Between what ages is growth in height of boys and girls respectively the greatest? In weight?

40. What heed should be given to these conditions by the teacher in discipline and in exacting work of pupils at these ages?

CHAPTER XVI.

FOR PROFESSIONAL GRADE.

ALGEBRA, GEOMETRY, LATIN, GENERAL HISTORY, PHYSICS, CHEMISTRY, GEOLOGY, BOTANY, ZOOLOGY, AND ASTRONOMY.

These questions are selected from the examinations for State certificate of New York, from 1882 to 1888, and represent in general the knowledge of a subject necessary to secure a certificate of professional grade.

ALGEBRA.

1. Discuss, and illustrate by suitable examples, the treatment of a minus sign of a subtrahend, and of minus into minus in multiplication.

2. Find greatest common divisor and reduce to lowest terms the following:

$$\frac{12x^2 - 15xy + 3y^2}{6x^3 - 6x^2y + 2xy^2 - 2y^3}.$$

3. Find the values of the unknown quantities in the following:

$$x - \frac{z-y}{3} = 19\tfrac{6}{7},$$

$$\frac{y}{3} + \frac{x+z}{7} = 1, \quad \text{and}$$

$$2z - 14y + x = 5.$$

4. Add $\sqrt{(1+a)^{-1}}$, $\sqrt{a^2(1+a)^{-1}}$, and $a\sqrt{(1+a)(1-a)^{-2}}$.

5. Given $\frac{x-9}{\sqrt{x}+3}+\frac{x-4}{\sqrt{x}-2}=\frac{4(x-16)}{\sqrt{x}+4}$, to find the value of x.

6. Discuss the methods of completing the squares in affected quadratic equations, and prove the correctness of each.

7. Two cubical vessels have together a capacity of 1072 cubic inches, and the sum of their heights is 16 inches; what is the capacity of each?

8. Given $x+\sqrt{x} : x-\sqrt{x} :: 3\sqrt{x}+6 : 2\sqrt{x}$, to find the value of x.

9. Prove the propositions in proportion employed in solving the last example.

10. Four numbers are in geometrical progression. Their sum is 120, and the last term is to one half the sum of the means as 9 to 2. What are the numbers?

11. Find the literal value of x in the equation

$$x+m=(m^2+x\sqrt{n^2+x})^{\frac{1}{2}}.$$

12. Expand, by the binomial formula, $(a^2-2x)^5$.

13. Factor the quantity $21x^2-36x+15$. Write the work in full.

14. Derive the formula for the sum of an arithmetical series, when the extremes and the number of terms are given.

15. A certain number is expressed by three figures; 5 times the value expressed by the left-hand figure is 2 less than 2 times the value expressed by the right-hand figure; the sum of the values expressed by the three figures is 4 times the value expressed by the left-hand figure; and the product of the values expressed by the left-hand and right-hand figures is 4 more than the sum of

the values expressed by the three figures. What is the number ?

16. Define and give an example (*a*) of a pure quadratic equation ; (*b*) of an affected quadratic equation.

17. Expand $(m + x^1)^5$ by the binomial theorem.

18. How may the first member of any incomplete quadratic equation be made a perfect square ?

19. Explain the difference (*a*) between a coefficient and an exponent ; (*b*) between a factor and a term.

20. Define (*a*) Mathematics ; (*b*) Algebra ; (*c*) symbols of quantity ; (*d*) symbols of operation ; (*e*) a residual quantity.

21. What are the successive steps in the reduction of an affected quadratic equation ?

22. Find the fourth term of the proportion

$$z + y : (a + b)^2 :: x^2 - y^2 : ?$$

Reduce the proportion to an equation, and give reasons for the process.

23. Find, algebraically, five geometrical means between .001 and 1000.

GEOMETRY.

1. Show the difference between an angle of an equilateral triangle and an exterior angle of an octagon.

2. Show the difference between the square of the diameter of a circle and the square of a chord of 60°.

3. What line measures the distance between two parallel tangents, when that distance is greater than zero?

4. A triangle and a square have equal areas, but the base of the triangle is two and one-third times the side of the square. Find an expression for the altitude of the triangle in terms of the side of the square.

5. Show the ratio of the area of a square to that of a second square constructed on the semi-diagonal of the first.

6. The base of a hexagonal monument is 9 feet on a side. How much ground does it cover?

7. Draw diagram, and show that the space included between the arcs of four equal circles tangent to one another is equal to the difference between the area of one of the circles and the area of a square whose side is the length of the diameter of one of the circles.

8. Let a represent the longer and b the shorter of two lines. Demonstrate geometrically that

$$(a - b)^2 = a^2 - 2ab + b^2.$$

9. Show how to circumscribe a circle about a scalene triangle. Then state and demonstrate the proposition on which your solution depends.

10. Draw an oblique-angled parallelogram whose adjacent sides are in the ratio of 2 to 3—an acute angle of the parallelogram being an angle of 60°. Show all the work on the paper.

11. When will the perimeter of a regular polygon and the periphery of an equivalent circle coincide?

12. Find an expression for the circumference of a circle in terms of the radius.

13. What is the name of that regular polygon whose side equals the radius of the circumscribed circle? Demonstrate the equality.

14. State and prove the proposition for determining the sum of all the interior angles of a regular polygon.

15. Demonstrate the following: If all the sides of a regular polygon be produced in the same direction, the sum of all the exterior angles thus formed will equal 360°.

16. Demonstrate the process of finding the number of degrees in one of the interior angles of any regular polygon.

17. Prove that a chord of 60° equals the radius.

18. Prove that the areas of triangles having equal altitudes are to each other as their bases.

LATIN.

Cæsar is accepted in place of some other designated subject.

His (1) rebus (2) cognitis, exploratores centurionesque præmittit, qui locum idoneum (3) castris (4) deligant. Quum ex dediticiis (or deditititis) Belgis reliquisque Gallis complures Cæsarem secuti una iter facerent, quidam ex his (ut postea ex captivis cognitum est) eorum dierum consuetudine itineris nostri exercitus perspecta, (5) nocte ad Nervios pervenerunt atque (6) his (7) demonstrarunt, inter singulas legiones impedimentorum magnum (8) numerum intercedere, neque esse quidquam (9) negotii, quum prima legio in castra (10) venisset reliquæque legiones magnum (11) spatium abessent, hanc sub sarcinis (12) adoriri; qua pulsa impedimentisque direptis, (13) futurum, ut reliquæ contra consistere non (14) auderent.

N.B. The numbers in parenthesis belong with the word following them.

1. Write, as nearly as possible, a literal translation.

2. Write an idiomatic translation.

3. Parse (1) and (2).

4. Parse (3). Account for the mode of (4) and give its parts.

5. *Ut postea, etc.* Why is not the verb in the subjunctive?

6. Account for the cases of (5), (6), (8), and (9), and for the form of (7).

7. Give full declension of (5), and account for the form of the nominative singular.

8. Parse (10) in full, account for the case of (11), and give the parts of (12).

9. Parse (13) in full.

10. Account for both the mode and tense of (14).

11. Translate into Latin the following sentences: Little rills flow into great oceans. The Roman soldiers fought fiercely and conquered the enemy.

12. Translate the following passage into idiomatic English:

Erant hæ difficultates belli gerendi, quas supra ostendimus, sed multa Cæsarem tamen ad id bellum incitabant: injuriæ retentorum equitum Romanorum, rebellio facta post deditionem, defectio datis obsidibus, tot civitatum conjuratio; imprimis ne, hac parte neglecta, reliquæ nationes sibi idem licere arbitrarentur. Itaque cum intellegeret omnes fere Gallos novis rebus studere, et ad bellum mobiliter celeriterque excitari, omnes autem homines natura libertati studere et conditionem servitutis odisse, priusquam plures civitates conspirarent, partiendum sibi ac latius distribuendum exercitum putavit.

13. What portions of the first sentence are in opposition to *multa*?

14. Parse *gerendi, obsidibus, rebus, studere* (after *libertati*), and *latius.*

15. Give the principal parts of *erant, ostendimus, odisse, partiendum;* decline *omnes.*

16. Make a list of the connectives in the passage; and after each put the name of the part of speech to which it belongs.

17. Translate: Si quid accidat Romanis, summam in

spem per Helvetios regni obtinendi venire; imperio populi Romani non modo de regno, sed etiam de ea, quam habeat gratia desperare. Reperiebat etiam in quaerendo Cæsar, quod prœlium equestre adversum paucis ante diebus esset factum, initium ejus fugæ factum a Dumnorige atque ejus equitibus; nam equitatui, quem auxilio Cæsari Ædui miserant, Dumnorix præerat.

18. Give syntax of *regni, obtinendi,* and *equitatui.*

19. Write two Latin sentences,—one illustrating the use of the historical infinitive; and one, the indirect discourse involving a subject in the accusative.

20. What would you name as the benefits of studying Latin?

GENERAL HISTORY.

1. Name the three great periods of history. State the time embraced in each, and the events marking their separation.

2. State some effects of each of the following conquests: the Greek; the Roman; the Mohammedan; the Norman.

3. Name the most illustrious persons of the Renaissance period. Tell to what country each belonged, and in what respect each distinguished himself.

4. Give an account of Charles V.

5. Give some account of the Trojan war, and the literary productions to which it gave rise.

6. State one important fact in the life of each of the following persons: Aristides, Miltiades, Leonidas, Themistocles, and Socrates.

7. What two states were the chief opponents in the Peloponnesian war? What was the issue of the war? About how many years ago did it occur?

8. Between what leaders was the battle of Actium fought?

9. What was the Spanish Armada? For what was it organized? What were the results of its defeat?

10. Give a brief account of Charles I. of England.

11. How and when was the Moslem power checked in its career of conquest in Europe?

12. Mention the four events or series of events occurring between the fall of the Roman Empire and the middle of the sixteenth century that, in your opinion, have had the greatest influence upon the civilization of to-day.

13. Give two causes which led to the French Revolution, and name three persons prominent in it.

14. In the French government what changes have taken place since the fall of Bonaparte in 1815?

15. In the English revolution of 1689, what changes took place in the sovereignty of the nation?

16. What three sovereigns of England were the children of Henry VIII.?

17. What positive evils and what incidental good resulted from the crusades?

18. What invention and what scientific discovery preceded and rendered possible the geographical discoveries of Columbus and his contemporaries?

19. By whom was the "Magna Charta" granted? State something of its contents to show its great significance in English history.

20. When did Victoria assume the throne of Great Britain? When was she crowned Queen?

PHYSICS.

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1. A ball is hurled from the ground vertically with such velocity that it ascends 176 feet the first second. To what height will it ascend, and in how many seconds return?

2. A 200-lb. weight is attached to a six-foot lever six inches from one end (fulcrum), and to the other end is

attached a movable pulley. A rope fastened to the ceiling goes through this movable pulley and over a fixed pulley fastened to the ceiling. What weight must be attached to the free end of the rope to balance the weight on the lever (friction and weight of rope, pulleys, and lever not considered)?

3. Illustrate by a figure and explain how a vessel may sail eastward with a north wind.

4. A solid mass weighs 24 pounds in air, 20 pounds in water, and 16 pounds in another liquid. What is the specific gravity of that other liquid?

5. What influence have variations of density and temperature upon velocity of sound in air?

6. If the barometric column stands at 30 inches, and the pressure of the atmosphere be 14.7 pounds to the square inch, what does a cubic foot of mercury weigh?

7. Show the mechanical relation of the screw to the inclined plane.

8. What is meant by "persistence of force"? Give illustrations.

9. Explain the action of a siphon. Give illustrations of natural siphons.

10. Two closed tanks on the same level and below the level of the water in a reservoir communicate with the reservoir, one by one pipe and the other by two; the pipes are all of the same size. What is the relative pressure of the water in the two tanks? Explain your answer.

11. What absolute gain is obtained by the use of any of the mechanical powers? Of what practical use are they in the economics of life?

12. State two causes that affect the boiling point of water.

13. Explain the formation of frost.

14. Explain the "echo."

15. What is the theory of the cause of differences in color?

16. When and why does a clear body of water appear shallower than it really is?

17. Explain, using a diagram, how rays of light, parallel to the axis of a convex lens, are brought to a focus.

18. How are the prismatic colors produced by a drop of dew in the sunlight?

19. What causes short-sightedness? What causes long-sightedness? What kind of glasses are required for the former? What for the latter? Why?

20. On what does the action of the magnetic telegraph depend?

CHEMISTRY.

1. Mention in full the difference between affinity and attraction of cohesion.

2. What is an element?

3. Do the specific properties of elements afford a means of ascertaining the specific properties of compounds? Illustrate.

4. What is the meaning of the term *atomic weight?* What is the meaning of the term *quantivalence,* or power of an atom?

5. What influence have heat and solution upon chemical action? Why?

6. What relation to digestion has common salt in food?

7. Explain the action of yeast in bread-making, and of sour milk in biscuit-making.

8. If muriatic acid be poured upon marble, (*a*) what will be the phenomena, and (*b*) what the resulting products?

9. Which of these products are found in the air, and in what proportions in a healthful atmosphere?

10. (*a*) Define allotropism, and (*b*) mention the allotropic forms of C and O.

11. Discuss the compounds of C and O.

12. How do pig-iron, wrought-iron, and steel differ *chemically?*

13. If a spark be applied to a mixture of 18 grains of O, and just sufficient H to unite chemically with all the O, (*a*) what will be the phenomena? (*b*) What compound will be formed? (*c*) How much of it?

14. (*a*) Define isomerism, and (*b*) give some examples of it.

15. (*a*) Define compound radicals, (*b*) give some examples of them, and (*c*) state the department of chemistry in which they abound.

16. Discuss starch.

17. What produces the light that comes from a luminous flame?

18. State the benefits of a knowledge of chemistry to the world at large and to the average student.

19. Give the common names of H_2O, HNO_3, H_2CO_3, NaCl, and N_2O.

20. For what is chlorine chiefly used? What is its color?

21. State the distinctions between acids, bases, and salts. What effect has each upon vegetable colors?

22. Give a test for a soluble chloride, as indicative of sewage impurities in water.

23. State the effects of carbonic-acid gas (1) upon animal life; (2) upon vegetable life.

24. What is dynamite? What is the one essential element in most explosives?

25. What gases unite to produce the heat in the calcium light? What causes the intense light?

GEOLOGY.

1. Give a general classification of rocks.
2. Account for the name applied to each term.
3. Define the terms shale and schist.
4. What is the difference between shale, slate, and grit?
5. Explain the difference between stratification and lamination.
6. What do you suppose to be the origin of petroleum?
7. What is *gneiss?* What is syenite?
8. In what geological formation would you look for trilobites?
9. What is argillaceous sandstone?
10. Give three characteristics by which quartz may be known.
11. Mention the great geological eras, designating them with reference to the absence or presence of life and its development into higher forms.
12. Mention two processes of nature by which granite may have been exposed on the tops of mountains.
13. Give the general name of the rocks which formed the first dry land.
14. Give (*a*) the general division of the tertiary strata in order, and (*b*) the etymology of the names.
15. Of what part (depth) of the earth's crust have geologists a fairly reliable knowledge?
16. Give three or more arguments in support of the theory of internal heat.
17. Which of the ingredients of granite form clay when worn down?

18. What is the original position of stratified rocks? What their present position? Account for the change.

19. What are metamorphic rocks, and what evidences are there of the changes they have undergone?

20. What are the principal means of identifying rocks of the same stratum, and of determining the relative age of the different strata?

21. How do you account for the salt deposits of this State?

22. What is the usually received hypothesis in regard to the origin of basaltic rock?

23. How may most carbonate rocks be detected? Give three examples.

24. What is the dip of a stratum? What is its cause?

25. What are the relative geologic positions of old red sandstone and the carboniferous rocks?

26. What present phenomena give a plausible explanation of the drift period?

27. To what age (or system) does the Medina sandstone belong? The Potsdam sandstone? The Genesee shale?

28. What evidence have we that at some period the sea covered all the land?

29. Explain the origin of the flint in chalk formations.

30. Mention the leading geological features of your own county.

BOTANY.

1. What is the principal office of leaves?

2. State the varieties of inflorescence, giving examples of each.

3. How are strawberry vines propagated?

4. How can you determine, by examining a tendril, whether it is a modified stem or a modified leaf?

5. By what change or process of development are *double flowers* produced?

6. What part of the flower becomes the pulp of the cherry?

7. In what part of the plant, Indian corn, do you find the pistils?

8. Is the corolla of a sunflower monopetalous or polypetalous?

9. What is the difference between a cyme and a raceme?

10. How would you distinguish a stem from a root?

11. What are adventitious buds? What special purpose do they serve?

12. Assuming that a plant is composed of only these three parts,—root, stem, and leaf,—of what part or parts is the (*a*) apple-blossom composed? (*b*) The onion? (*c*) The potato? (*d*) The bean-pod? (*e*) The thorn?

13. Mention five common evergreen conifers, and one that is deciduous.

14. Mention some of the ways by which the flowers of plants are fertilized.

15. Give examples of changes in plants that have been caused by cultivation.

16. Describe a tuber; a bulb; a corm.

17. What part of the flower develops to produce the greater portion of the apple? What part of the flower develops to produce the greater portion of the strawberry?

18. Give some account of plant-motion, with illustrative examples.

19. Give some account of forestry, the objects of forestry associations, and the necessity for preservative forestry laws.

20. Compare the family *Acer* with the family *Pinus* in regard to general form, form and permanence of leaf, and seeds and seed-vessels.

21. What is fruit? Illustrate by naming the fruit of a potato-plant.

22. What service do insects render in the fertilization of flowers?

23. Mention the parts of plants that are used as food.

24. What are the essential parts of a flower, and what are the functions of each?

25. Comparing an oak, a lilac, and a spire of grass: what differences do we observe in the stalk; and to what divisions do these differences give rise?

26. Comparing the leaf of an oak, a maple, and a plantain, what differences do we observe?

27. Comparing the cross-section of a corn-stalk with that of a maple, what peculiarities do we notice? What do they indicate? To what classification do they lead?

28. Comparing the pine and the elm, what is the most striking difference: and what names are given to the classes which this difference indicates?

29. Give an account of the *eucalyptus* tree.

ZOOLOGY.

1. Give the etymology of the word Zoölogy and define it.

2. What is the application of the term fauna?

3. What are the differences that distinguish reptiles from batrachians (amphibians)?

4. How does the heart of a bird differ from that of a snake?

5. Assign the following to appropriate classes: (*a*) a

cow; (*b*) a red squirrel; (*c*) a panther; (*d*) an oyster; (*e*) an elephant; (*f*) a fly; (*g*) a swan; and (*h*) a whale.

6. Describe your method of teaching zoölogy.

7. What name is given to the family of birds that corresponds in structure and habits to the *carnivora* among mammals? Describe two characteristic features of that family of birds.

8. Describe the manner in which a butterfly takes its food.

9. Give the names and locations of the different fins commonly found on a fish.

10. Why are the whale and the codfish classed in the same sub-kingdom of animals?

11. To which class of vertebrates do the porpoises belong? Why?

12. As a matter of education, what good will result from the study of zoölogy?

13. To what order of mammals does the rat belong, and what are the characteristics of the order?

14. Describe the mole and its habits; and state the characteristics of the order to which it belongs.

15. What characteristics of a bird's skeleton show adaptation of structure to mode of life?

16. Give general characteristics of structure and habits of the order *raptores* among birds.

17. Give some account of the structure and transformations of a frog.

18. What are the two most important characteristics of a true insect?

19. State some of the prominent characteristics of rodents, and name five species belonging to the order.

20. Describe the bat. To what general class of animals does it belong?

21. What peculiar structure of the parrot fits it for tree-climbing?

ASTRONOMY.

1. Name and define all the kinds of bodies which compose the Solar System.

2. Name and define, as far as is known, all the kinds of bodies which compose the visible heavens outside of the Solar System.

3. Give particular descriptions of Venus, Jupiter, and Saturn, as seen from the earth.

4. Give some account of the discovery of the planet Neptune.

5. In the Solar System, what is found between Mars and Jupiter? What is the theory which accounts for the same?

6. Explain and illustrate by diagram what is meant, in planetary motion, by "passing over equal spaces in equal time."

7. What is the general law of gravitation? In applying this law to the relations of the earth to other bodies, what is taken as the unit of measure?

8. What is a constellation? How do the signs of the zodiac differ from other constellations?

9. Why is the same side of the moon always towards the earth?

10. Enumerate some of the economic uses of astronomic knowledge.

11. Mention the planets in order, beginning with the one nearest the sun.

12. Define parallax, and describe a process for finding the earth's approximate distance from the sun.

13. (*a*) What planets have satellites? (*b*) How many satellites has each of these planets?

14. Name five circumpolar constellations.

15. Define the term *variable star*, and name one.

16. Explain how the sun's rays can strike the north side of a building in this latitude.

17. Under what conditions will an eclipse of the sun be annular?

18. On what part of the earth is the north star never visible? Why?

19. By what terms is the location of a heavenly body indicated? Explain their meaning.

20. Explain the meaning of the terms *conjunction, opposition, transit, asteroid, satellite.*

21. Why can there never be a transit of a superior planet?

22. What is the difference between apogee and perihelion?

23. What determines the location of the tropics of a planet? The polar circles? The zones?

24. Explain the difference between a solar day and a sidereal day.

ANSWERS TO ALGEBRA.

1. From $a - b$ subtract $c - d$. First subtract c. As the quantities are unlike, c cannot be taken from $a - b$ otherwise than by indicating the difference, which is $a - b - c$. But the quantity which was to be subtracted is less than c by d; therefore, too much has been taken away by d, and to get the true remainder d must be added, which gives $a - b - c + d$. By inspection it will be found that the quantity d, having in the subtrahend the minus sign, appears in the remainder with a plus sign.

Multiply $a - b$ by $c - d$. First multiply $a - b$ by c. a added to itself *twice* $= 2a$, *three* times $= 3a$, c times $= ca$ or ac. b, therefore, multiplied by $c = bc$. The product then of a and c or ac is greater than the true product by b times c or bc; for it was required not to multiply a by c, but $a - b$, a quantity less than a by b. Hence, the true product of $a - b$ by c is $ac - bc$. The multiplicand $a - b$, though, was to be multiplied by $c - d$. $a - b$ multiplied by c gives $ac - bc$. The multiplier used, c, is larger than the given multiplier by d, hence, to obtain the true product, d times $a - b$, or $ad - bd$, must be *subtracted* from $ac - bc$, which gives $ac - bc - ad + bd$. By inspection it is seen that the factors, $-b$ of the multiplicand, and $-d$ of the multiplier, appear in the product as the term bd, having the sign *plus*.

2. $\dfrac{12x^2 - 15xy + 3y^2}{6x^3 - 6x^2y + 2xy^2 - 2y^3} =$ Multiply denominator by 6

$$\begin{array}{r|l} 36x^3 - 36x^2y + 12xy^2 - 12y^3 & 12x^2 - 15xy + 3y^2 \\ 36x^3 - 45x^2y + 9xy^2 & 3x \\ \hline 3y & 9x^2y + 3xy^2 - 12y^3 \quad \text{Reject } 3y \\ 12x^2 - 15xy + 3y^2 & 3x^2 + xy - 4y^2 \\ 12x^2 + 4xy - 16y^2 & 4 \\ \hline -19y & -19xy + 19y^2 \quad \text{Reject } -19y \\ 3x^2 + xy - 4y^2 & x - y \quad \text{The G. C. D.} \\ 3x^2 - 3xy & 3x + 4y \\ \hline 4xy - 4y^2 & \\ 4xy - 4y^2 & \end{array}$$

$$x - y \left| \frac{12x^2 - 15xy + 3y^2}{6x^3 - 6x^2y + 2xy^2 - 2y^3} = \frac{3(4x - y)}{2(3x^2 + y^2)} = \text{Lowest terms.} \right.$$

3. $x - \frac{z-y}{3} = 19\frac{6}{7} = 21x - 7z + 7y = 417$

$\frac{y}{3} + \frac{x+z}{7} = 1 = 7y + 3x + 3z = 21$

$2z - 14y + x = 5$

$7y + 21x - 7z = 417$

$7y + 3x + 3z = 21$

$18x - 10z = 396$

$7x + 8z = 47$

$72x - 40z = 1584$

$35x + 40z = 235$

$107x = 1819$

$x = 17$

$2z - 14y + 17 = 5$

$2z - 14y = 5 - 17$

$2z - 14y = -12$

$-14z + 14y = 120$

$-12z = 108$

$z = -9$

$7y + 51 - 27 = 21$

$7y = 21 - 51 + 27$

$7y = -3$

$y = -\frac{3}{7}$.

$2z - 14y + x = 5$

$-14y + x + 2z = 5$

$14y + 6x + 6z = 42$

$7x + 8z = 47$

$357 - 7z + 7y = 417$

$-7z + 7y = 417 - 357$

$-7z + 7y = 60$

$x = 17$

$y = -\frac{3}{7}$

$z = -9$

4. $\sqrt{(1+a)^{-1}} = \sqrt{\frac{1}{1+a} \times \frac{1+a}{1+a}} = \frac{1}{1+a}\sqrt{1+a}$

$\sqrt{a^2(1+a)^{-1}} = \sqrt{\frac{a^2}{1+a} \times \frac{1+a}{1+a}} = \frac{a}{1+a}\sqrt{1+a}$

$a\sqrt{(1+a)(1-a)^{-2}} = a\sqrt{\frac{1+a}{(1-a)^2}} = \frac{a}{1-a}\sqrt{1+a}$

$\frac{1}{1+a}\sqrt{1+a} + \frac{a}{1+a}\sqrt{1+a} + \frac{a}{1-a}\sqrt{1+a} = \frac{1}{1-a}\sqrt{1+a}$. *Ans.*

5. $\frac{x-9}{\sqrt{x}+3} + \frac{x-4}{\sqrt{x}-2} = \frac{4(x-16)}{\sqrt{x}+4}$

$\sqrt{x} - 3 + \sqrt{x} + 2 = 4(\sqrt{x} - 4)$

$2\sqrt{x} = 15$

$4x = 225$

$x = 56\frac{1}{4}$

6. Can be found in almost any work upon Algebra—Loomis', Robinson's, Wentworth's, Wells', etc.

7. x = height of one vessel
y = " " second "
(1) $x^3 + y^3 = 1072$
(2) $x + y = 16$
(3) $x^2 - xy + y^2 = 67$
(4) $x^2 + 2xy + y^2 = 256$
(5) $3xy = 189$
(6) $xy = 63$

Subtracting equation (6) from equation (3) gives equation (7) $x^2 - 2xy + y^2 = 4$

$x - y = \pm 2$
$x + y = 16$

$2x = 18$ or 14
$x = 9$ or 7
$2y = 14$ or 18
$y = 7$ or 9
$x^3 = 343$ *Ans.*
$y^3 = 729$ *Ans.*

8. $x + \sqrt{x} : x - \sqrt{x} :: 3\sqrt{x} + 6 : 2\sqrt{x}$

$2x\sqrt{x} + 2x = 3x\sqrt{x} + 3x - 6\sqrt{x}$

$6\sqrt{x} = x\sqrt{x} + x$ Dividing by $\sqrt{x}$ gives

$6 = x + \sqrt{x}$ Completing the square,

$x + \sqrt{x} + \frac{1}{4} = \frac{25}{4}$

$\sqrt{x} + \frac{1}{2} = \pm \frac{5}{2}$

$\sqrt{x} = \pm \frac{5}{2} - \frac{1}{2}$

$\sqrt{x} = 2$ or -3

$x = 4$ or 9

9. If four quantities are in proportion, the product of the extremes is equal to the product of the means.

$$a : b \text{ as } c : d.$$

Writing the proportion in another form, we have $\frac{a}{b} = \frac{c}{d}$. Clearing of fractions gives $ad = bc$, the product of the extremes equal to the product of the means, which was to be proved.

10. x = first term;
y = the ratio;
xy = second term;
xy^2 = third term;
xy^3 = fourth term;
(1) $x + xy + xy^2 + xy^3 = 120$

$xy^3 : \frac{xy + xy^2}{2} :: 9 : 2$

$2xy^3 = \frac{9xy + 9xy^2}{2}$

$4xy^3 = 9xy + 9xy^2$

$4y^2 = 9 + 9y$ Transposing and completing the square,

$4y^2 - 9y + \frac{81}{16} = \frac{225}{16}$

$2y - \frac{9}{4} = \pm \frac{15}{4}$

$2y = 6$ or $\frac{3}{2}$

$y = 3$ or $\frac{3}{4}$

Substituting first value of y in equation (1).

$x + 3x + 9x + 27x = 120$

$40x = 120$

$x = 3$.

Substituting second value of y,

$x = 42\frac{31}{35}$.

First term, 3 or $42\frac{31}{35}$.
Ratio 3 or $\frac{3}{4}$.

11. $x + m = \sqrt{m^2 + x\sqrt{n^2 + x}}$

$x^2 + 2mx + m^2 = m^2 + x\sqrt{n^2 + x}$

$x + 2m = \sqrt{n^2 + x}$

$x^2 + 4mx + 4m^2 = n^2 + x$

$x^2 + (4m - 1)x = n^2 - 4m^2$ Completing the square,

$x^2 + (4m - 1)x + \left(\frac{4m-1}{2}\right)^2 = \frac{4n^2 - 8m + 1}{4}$

$x + \frac{4m-1}{2} = \pm \frac{1}{2}\sqrt{4n^2 - 8m + 1}$

$x = \frac{4m - 1 \pm \sqrt{4n^2 - 8m + 1}}{2}$.

12. $(a^2 - 2x)^5 = (a^2)^5 - 5(a^2)^4 2x + 10(a^2)^3(2x)^2 -$
$10(a^2)^2(2x)^3 + 5(a^2)(2x)^4 - (2x)^5 =$
$a^{10} - 10a^8x + 40a^6x^2 - 80a^4x^3 + 80a^2x^4 - 32x^5$.

13. $21x^2 - 36x + 15$. It is evident that the first terms of the two factors might be $21x$ and x, or $3x$ and $7x$, since the product of either of these pairs is $21x^2$. Likewise the last terms of the two factors might be 15 and 1, or 3 and 5. From these it is necessary to select such as will produce the middle term of the trinomial. They are found by trial to be $21x$ and x, and -15 and -1. Therefore the factors are $21x - 15$ and $x - 1$.

14. $2 . 5 . 8 . 11 . 14$ Increasing series.
$14 . 11 . 8 . 5 . 2$ Decreasing series.
$16 . 16 . 16 . 16 . 16$

$16 \times 5 = 2 \times$ Sum of series.

Hence $\frac{(a + l)n}{2} = S$.

15. $x =$ unit's digit,
$y =$ ten's digit,
$z =$ hundred's digit,

(1) $5z + 2 = 2x$

(2) $x + y + z = 4z$

(3) $xz - 4 = x + y + z$

$xz - 4 = 4z$ (From 2 and 3)

$z = \frac{4}{x - 4}$

$\frac{20}{x - 4} + 2 = 2x$ (Substituting in 1)

$2x^2 - 10x = 12$

$x^2 - 5x + \frac{25}{4} = \frac{49}{4}$

$x - \frac{5}{2} = \pm \frac{7}{2}$

$x = 6$

$x = 6$
$z = 2$
$y = 0$
206 *Ans.*

16. An equation containing no higher power of the unknown quantity than its *square* is a quadratic equation. If the equation contains the *square only*, it is a pure quadratic equation; as, $bx^2 = c$. But if the equation contains the *first power also*, it is an affected quadratic equation; as $ax^2 + bx + c = 0$.

17. $(m + x^{\frac{1}{3}})^5$

$m = a$

$x^{\frac{1}{3}} = b$

$(a+b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

$m^5 + 5\,(m^4)(x^{\frac{1}{3}}) + 10\,(m^3)(x^{\frac{1}{3}})^2 + 10\,(m^2)(x^{\frac{1}{3}})^3 + 5m\,(x^{\frac{1}{3}})^4 + (x^{\frac{1}{3}})^5$

$m^5 + 5m^4x^{\frac{1}{3}} + 10m^3x^{\frac{2}{3}} + 10m^2x + 5mx^{\frac{4}{3}} + x^{\frac{5}{3}}$. *Ans.*

18. Reduce the equation to the form $x^2 + px = q$, and add to the first member the square of half the coefficient of x.

19. (*a*) A coefficient shows how many times a quantity has been added to itself, while an exponent shows how many times the quantity has been multiplied by itself.

(*b*) A factor of a quantity is an even divisor of that quantity, while a term is an algebraic expression, the parts of which are not separated by the signs + or − .

20. Mathematics has been defined as the science of quantity. Algebra is a branch of mathematics in which the relations of numbers are investigated, and the reasoning abridged and generalized by means of *symbols*. Symbols of quantity are the figures of Arithmetic used to represent known quantities and determined values, and the letters of the alphabet used to represent any quantities whatever, whether known or unknown. Symbols of operation are the signs +, −, ×, ÷, coefficients, and exponents, which denote respectively addition, subtraction, multiplication, division, the number of times a quantity is added to itself, and the number of times a quantity is multiplied by itself. A residual is an algebraic expression of two terms connected by the minus sign; as, $a - b$.

21. $z + y : (a+b)^2 :: x^2 - y^2 : ?$

$$\frac{(a+b)^2 \times (x^2 - y^2)}{z+y} = ?$$

$$\frac{a^2x^2 + 2abx^2 + b^2x^2 - a^2y^2 - 2aby^2 - b^2y^2}{z+y}. \quad \textit{Ans.}$$

22. Can be found in almost any work upon Algebra—Loomis', Robinson's, Wentworth's, Wells', etc.

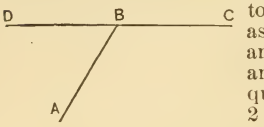
23. $a = .001$
$l = 1000$
$n = 7$
$r = x$

$l = ar^{n-1}$
$l = ar^6$
} Formula.
$x =$ Ratio.
$1000 = .001x^6$
$x^6 = 1000000$
$x = 10$

Inserted terms .01, .1, 1, 10, 100.

ANSWERS TO GEOMETRY.

1. Let *ABC* be the angle of an octagon. By previous proposition the interior angles of a polygon are equal to two right angles taken as many times as the polygon has sides less 2. The angle *ABC* being one of the eight equal angles of an octagon will equal $\frac{1}{8}$ of this quantity. Then the angle *ABC* equals $\frac{2 \text{ right angles} \times 6}{8} = \frac{12}{8} = \frac{3}{2}$.



Hence the angle *DBA*, an exterior angle of an octagon, equals 2 right angles $-$ (*ABC*) $= 2$ right angles $- \frac{3}{2} = \frac{1}{2}$ of one right angle or 45°.

One angle of an equilateral triangle $= \frac{180°}{3} = 60°$. The difference between an angle of an equilateral triangle and the exterior angle of an octagon $= 60° - 45°$ or 15°.

2. A chord of 60° is the radius of the circle. The diameter being double the radius, the square described on the diameter is 4 times the square described on the radius.

3. The line joining the points of contact is a diameter, and is perpendicular to both tangents Therefore a diameter measures the distance between two parallel tangents, when that distance is greater than zero.

4. x = side of the square; y = altitude of the triangle;
x^2 = area of the square; $\frac{7xy}{6}$ = area of the triangle;
$2\frac{1}{3}x$ = base of the triangle;

$$\frac{7xy}{6} = x^2; \qquad y = \frac{6x}{7}.$$

The altitude of the triangle $= \frac{6}{7}$ of the side of the square.

5. If the side of the larger square be represented by unity, the diagonal is the square root of 2. The side of the second square will be $\frac{\sqrt{2}}{2}$, and its area $\frac{1}{2}$. Therefore, the ratio of the area of a square to that of a second square constructed on the semi-diagonal of the first is 2.

6. The base of the hexagonal monument may be divided into six equilateral triangles, with 9 ft. as the length of a side. By finding the area of one of these triangles and multiplying this by 6 we shall obtain the area of the hexagon.

A line drawn from the middle point of one side of the triangle to the vertex will divide the triangle into two right-angled triangles, the perpendicular of either being the altitude of the equilateral triangle.

One half the side of the equilateral triangle, $4\frac{1}{2}$ feet, equals the

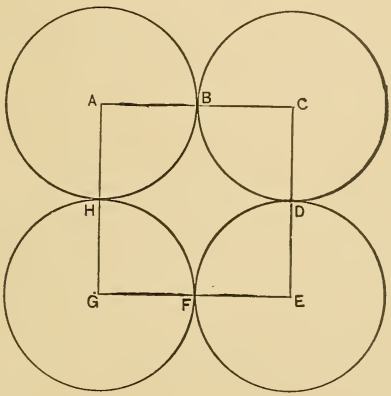
base of the right-angled triangle. Then $4\frac{1}{2}$ ft. squared $= \frac{81}{4}$ ft.; 9 ft. squared $= \frac{324}{4}$ ft.; $\frac{324}{4} - \frac{81}{4} = \frac{243}{4}$.

$$\sqrt{\frac{243}{4}} = \frac{15.58}{2} = 7.79, \text{ altitude of equilateral triangle;}$$

$$\frac{9 \times 7.79}{2} = 35.055 \text{ sq. ft., area of equilateral triangle;}$$

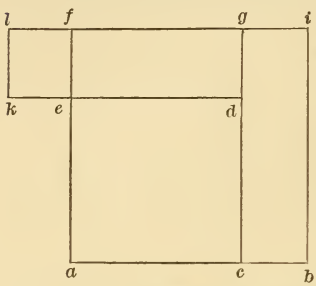
35.055 sq. ft. $\times$ 6 = 210.33 sq. ft. area, of base of monument.

7. Let the circles be tangent in such a way that the lines connecting their centres will be perpendicular. Then each of the figures



B A H, *B C D*, *D E F*, and *F G H* will be a quadrant of its circle. But the circles are equal; hence each quadrant is equal to $\frac{1}{4}$ of any circle, and the four quadrants together are equal to one of the circles. The figure *A E* is equal to the square of the diameter of one of the circles, for its sides are perpendicular by construction and each is equal to the diameter of one of the circles, being composed of two of the equal radii. Therefore the figure *B D F H*, equal to the difference between the four quadrants and the square *A E*, is equal to the difference between one of the circles and the square of its diameter. But when the lines connecting their centres cease to be perpendicular, the proposition ceases to be true; for, as may be shown with equal coins, the circles may be rolled upon each other and still kept tangent, and the size of the figure enclosed by them will be changed, while the value of the circles and the squares of their diameters are constant.

8. On $a\,b$ construct the square $a\,b\,i\,f$; from c draw $d\,g$ parallel to $b\,i$; lay off $c\,d$ equal to $a\,c$, and from d draw $d\,k$ parallel and equal to $b\,a$; complete the square $e\,f\,l\,k$: then will $e\,k$ be equal to $b\,c$, and $e\,f\,l\,k$ will be equal to the square of $b\,c$. The whole figure $a\,b\,i\,l\,k\,e$ is equal to the sum of the squares described on $a\,b$ and $b\,c$. The part $c\,b\,i\,g$ is equal to the rectangle of $a\,b$ and $b\,c$; the part $d\,g\,l\,k$ is also equal to the rectangle of $a\,b$ and $b\,c$. If from the whole figure $a\,b\,i\,l\,k\,e$ the two parts $c\,b\,i\,g$ and $d\,g\,l\,k$ be taken, there will remain the part $a\,c\,d\,e$, which is equal to the square of $a\,c$. Therefore

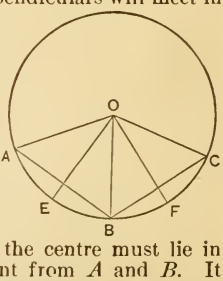


$$\overline{a\,c}^2 = \overline{a\,b}^2 + \overline{b\,c}^2 - 2\,a\,b \times b\,c.$$

9. Bisect any two adjacent sides and through the point of bisection draw lines perpendicular to the sides, and produce these lines till they intersect. Connect this point of intersection with the vertices of the angles. Then from the intersection of the perpendiculars as a centre, and with a radius equal to the distance from this point to the vertex of any angle, sweep a circle which will pass through the three vertices, thus circumscribing the scalene triangle.

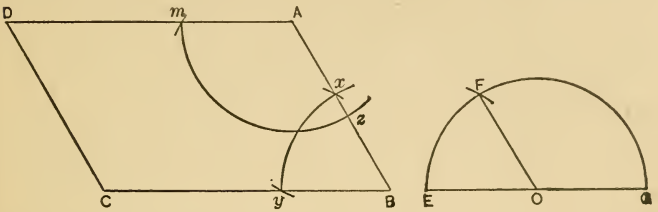
PROP. *Through three points not in the same straight line, one circumference may be made to pass, and but one.*

Connect A, B, and C with straight lines. Bisect $A\,B$ and $B\,C$ by the perpendiculars $O\,E$ and $O\,F$. These perpendiculars will meet in the same point O, as $B\,C$ is not the prolongation of $A\,B$. As $O\,E$ is perpendicular to $A\,B$ at its middle point, $A\,O$ equals $O\,B$. (*If a straight line be drawn perpendicular to another line at its middle point, any point of the perpendicular is equally distant from the extremities of the line*.) For the same reason $O\,B$ is equal to $O\,C$. Hence $A\,O = O\,B = O\,C$. If a circumference be drawn with one of these lines as a radius, it will pass through the points A, B, and C.



But one circumference can be drawn, for the centre must lie in $O\,E$, otherwise it would be unequally distant from A and B. It must lie in $O\,F$, otherwise it would be unequally distant from B and C. As the centre is in both $O\,E$ and $O\,F$, it must lie at their intersection, and as the two lines can intersect in but one point, then there can be but one centre. Therefore, the proposition.

10. Take $A\,B$ as one side. Then at either extremity, as B, with a convenient radius sweep an arc adjacent to $A\,B$ with B as a centre.



At the point of intersection of this arc and $A\,B$, as a centre, with the same radius sweep a second arc intersecting the first at Y. Through B and Y draw $B\,C$ a distance of three units whose lengths are the halves of $A\,B$. Then the angle $A\,B\,C$ will be one of 60°. For if the three points X, B, and Y be connected an equilateral triangle will be formed, each angle of which will equal 60°.

Upon a line $E\,G$ with a convenient radius construct an angle of 60° adjacent $E\,G$, as the angle $F\,O\,E$. Then will the angle $F\,O\,G$ be its supplement. At A as a centre with the same radius draw an arc adjacent to $A\,B$, intersecting it at Z. From Z with a radius equal to chord $F\,G$ measure off the same chord on the arc $M\,Z$. Through its extremity M and A draw $A\,D$ equal to $B\,C$. $A\,D$ and $B\,C$ are parallel because they form the supplementary angles $D\,A\,B$ and $A\,B\,C$. They are also equal by construction. Connect D and C, and $D\,B$ will be a parallelogram fulfilling the conditions, for its opposite sides are equal and parallel, and its adjacent sides have the ratio of 2 : 3, and its acute angle is one of 60°.

11. The perimeter of a regular polygon and the periphery of a circle will coincide when the polygon and the circle have the same diameter, and the number of the sides of the polygon is infinite.

For the demonstration of the remaining problems, see any text-book on Geometry.

ANSWERS TO LATIN.

1. These things having been found out, scouts and centurions he sent ahead, who a place suitable for a camp should select. When from the surrendered Belgians and remaining Gauls a great many Cæsar following marched some from these (as afterward from the prisoners was found out) of those days the custom of the march of

our army being seen, by night to the Nervii came and to these showed, between the separate legions of baggage a great amount to lie, neither to be anything of trouble, when the first legion into camp had come and the remaining legions a great distance should be away, this under packs to attack: which having been defeated, and the baggage having been plundered it would be that the remaining in opposition to stand would not dare.

2. When these things had been found out, he sent forward the spies and centurions to select a suitable place for a camp. When many of the surrendered Belgians and the other Gauls followed Cæsar and travelled with him, certain ones of these (as he afterwards learned from the captives), after finding out our army's custom of marching in those days, went at night to the Nervii and told them that a large amount of baggage came between each legion, and that there was no difficulty in making an attack upon the first legion impeded by burdens, when it came into camp and the other legions were still at a great distance; when they had driven this legion back and seized the baggage, the result would be that the others would not dare to offer them opposition.

3. *Rebus cognitis* taken together form an ablative absolute, *rebus* being a feminine noun from *res, rei. Cognitis* is the perfect passive participle of *cognosco, cognoscere, cognovi, cognitus.* It expresses cause and time, and modifies *præmittit.*

4. *Castris* is a neuter noun, from *castra, castrorum,* the singular having a different meaning. It is found in the dative plural. after *idoneum,* a word of fitness.

Deligant is subjunctive, because it expresses purpose with *qui.* It comes from *deligo, delegere, delegi, delectus.*

5. *Cognitum est* is in the indicative, because *ut* here is comparative

6. *Nocte* is an ablative of time, modifying *pervenerunt.*

His is a dative, indirect object after *demonstrarunt.*

Numerum is an accusative, subject of the infinitive *intercedere.*

Negotii is a partitive genitive with *quidquam.*

Demonstrarunt is in the third per. plural, perfect tense, and has *ve* dropped out.

		Sing.	Plu.
7.	Nom.	*Nox.*	*Noctes.*
	Gen.	*Noctis.*	*Noctium.*
	Dat.	*Nocti.*	*Noctibus.*
	Acc.	*Noctem.*	*Noctes.*
	Voc.	*Nox.*	*Noctes.*
	Abl.	*Nocte.*	*Noctibus.*

The nom. sing. *nox* comes from the union of the stem termination and *s,* the regular nominative ending resulting in *x.*

8. *Venisset* is a verb, and is found in the subj. mood, pluperfect tense, 3d per., sing. num. Its subject is *prima legio,* and it is modified by *in castra.* It is subjunctive, because it is a temporal

clause with a shade of cause in it. *Spatium* is in accusative, expressing extent of space.

Principal parts of *adoriri* are *adorior, adoriri, adortus sum.*

9. *Futurum* is the fut. infinitive with *esse* omitted. It is the principal verb of indirect discourse. It is future, because it was future in the direct. Its subject is the *ut* clause following.

10. *Auderent* is subjunctive because it is an *ut* complementary clause, derived from result. It is imperfect, because it is incompleted action in past time.

11. *Rivuli parvi in oceanos magnos fluunt.*
Milites Romani acriter dimicaverunt hostesque vicerunt.

12. There were the difficulties, which we have shown above, to waging war; but nevertheless many reasons urged Cæsar on to the war—the wrong of retaining the Roman knights, raising a rebellion after surrender, defection after giving hostages, the conspiracy of so many states, and especially the fear that if this case were overlooked, other states would think that they might do the same. And so on learning that almost all the Gauls desire revolution, and are easily and quickly moved to war, and furthermore, that all men naturally desire liberty and hate a condition of slavery, he thought that he ought to divide the army and distribute it more widely before more states should conspire.

13. The appositive of *multa* is *injuriae arbitrarentur.*

14. *Gerendi* is found in the gen. sing. neuter of the gerundive, agreeing with *belli.* It comes from *gero, gerere, gessi, gestus.*

Obsidibus is a noun of com. gender, coming from *obses, obsidis.* It is found in the ablative plu., and taken with *datis* forms an ablative absolute.

Rebus, a fem. noun from *res, rei,* is found in the dative plu. after *studere,* which regularly takes the dative. It is modified by *novis.*

Studere, with its subject *omnes homines* and its modifier *natura* and object *libertati,* is an infinitive object of *intellegeret.* It comes from *studeo, studere, studui.*

15. *Sum, esse, fui.*
Ostendo, ostendere, ostendi, ostensus, or *ostentus.*
Odi, odisse.
Partior, partiri, partitus sum.

	Masc. and Fem. Sing.	Neuter.	Masc. and Fem. Plural.	Neuter.
Nom.	*Omnis.*	*Omne.*	*Omnes.*	*Omnia.*
Gen.	*Omnis.*		*Omnium.*	
Dat.	*Omni.*		*Omnibus.*	
Acc.	*Omnem.*	*Omne.*	*Omnes.*	*Omnia.*
Ab.	*Omni.*		*Omnibus.*	

16. *Quas.*—Pronoun.
Sed.—Conjunction.
Tamen.— "

Ne.—Conjunction.
Itaque.— "
Cum.— "

Et.—Conjunction. *Priusquam.*—Conjunction.
Que.— " *Ac.*— "
Autem.— "

17. If anything should happen to the Romans, he had the greatest hope of obtaining the ruling power through the Helvetians; under the rule of the Roman people, he despaired, not only of reigning, but even of keeping that popularity which he had. Cæsar also found out, upon inquiry, that in the unsuccessful cavalry battle which had been fought a few days before, the retreat had been begun by Dumnorix and his cavalry; for Dumnorix commanded the cavalry which the Ædui had sent as a reinforcement to Cæsar.

18. *Regni* is in the objective genitive after *spem.*
Obtinendi is the genitive case of the gerundive, agreeing with *regni.*
Equitatui is the dative singular, object of *præerat.* Most verbs compounded with *ad, ante, con, in, inter, ob, post, præ, pro, sub,* and *super* take the dative.

19. *Tum Cæsar Helvetiis fidem et vitam polliceri.*
Existimavi eum venisse.

20. (Left for student.)

ANSWERS TO HISTORY.

1. Ancient, Mediæval, and Modern. The Ancient period dates from the earliest period to the fall of the Western Roman Empire, 476 A.D.; the Mediæval period from 476 A.D. to the discovery of America, 1492; the Modern period from the close of the 15th century to the present time.

2. The Greek conquest not only established the independence of the Greeks, but preserved the civilization of Europe. Their rule extended over all western Asia and Egypt. Greek language, literature, and art spreading over this territory, imbued the conquered races with Greek ideas and Greek civilization.

The Roman conquest brought to the conquerors control of immense territory, which led to the establishment of a provincial form of government. The revenue gained by taxing the provinces was used in erecting fine public buildings in Rome and carrying out a great system of public works throughout Italy. Greek scholars flocked into Rome, the influence of their culture leading to native production. Italy became overrun with natives from the conquered lands, and the intermixture of these races resulted in the degeneracy of the Roman race itself.

The Mohammedan conquest established the religion of Mohammed in the peninsula of Arabia and over a large part of Asia and Africa. It reached into Europe, but was finally arrested by Charles Martel, who appeared as a champion of Christianity. The Saracens insti-

tuted universities and museums, and preserved and transmitted much that was valuable in the writings of the Greeks and Persians.

The Norman conquest established in England "a strong centralized government." "A new feudal aristocracy" was founded; and England was brought into more intimate relations with the nations of continental Europe, by which means her advance in art, science, and general culture was greatly promoted.

3. The Renaissance period—1490 to 1648-9. Savonarola, an Italian, was leader of the democratic party in Florence. He preached asceticism, and violently denounced the degeneracy of the church and the paganism and vices of his time.

Leonardo da Vinci, Michael Angelo, Raphael, and Titian were distinguished as the great Italian masters of art.

Columbus belonged to this period, and also Vasco da Gama, a Portuguese navigator, who discovered the route to India round the Cape of Good Hope.

Magellan, a Portuguese admiral, circumnavigated the globe.

Martin Luther, leader of the German Reformation.

John Calvin preached Protestantism in its Presbyterian form at Geneva, and his followers spread through France under the name of Huguenots.

John Knox preached the same doctrine in Scotland.

William Shakespere, dramatist; Edmund Spenser, poet; Francis Bacon, philosopher; John Milton, poet, were Englishmen.

Ariosto and Tasso were Italian poets.

Cervantes, a Spaniard, was the author of the romance "Don Quixote."

Ignatius Loyola, a Spaniard, founder of the Order of Jesuits.

Copernicus, a German astronomer, first questioned the Ptolemaic theory of planetary motion, and demonstrated its falsity.

Galileo, an Italian astronomer, constructed the first telescope, and discovered the satellites of Jupiter and the ring of Saturn.

Kepler, astronomer, established the law of planetary motion.

4. Charles V., born in Ghent in 1500, was a grandson of Ferdinand and Isabella. Through the death of his paternal grandmother, he became ruler of Flanders at fifteen years of age. A year later, Ferdinand died, and Charles was made king of Spain and its possessions. In 1519, he inherited the duchy of Austria, and, in the next year, was elected Emperor of Germany, though both Francis I. of France and Henry VIII. of England sought the imperial crown. This last honor brought two serious troubles upon Charles. It involved him in wars with Francis I. and entangled him deeply in the religious controversy which had already begun in Germany. The direct cause of these wars with Francis was disputes about certain French and Spanish possessions. Although these wars were very disastrous, keeping nearly the whole of Europe in turmoil for over twenty years, at the end they left the respective possessions of the two kings about the same as at the beginning.

During this period the Christians had suffered much persecution, but the doctrines of the reformers had been spreading. The celebrated Smalkaldic League had been formed by the Protestant princes. In 1546, Charles made war upon this league, destroyed it, and punished its leaders. His harsh treatment of the conquered confederates led to another uprising, and this time the Protestant princes, aided by Henry II. of France, son of Francis I., were the victors. While the Diet of Augsburg was convened to settle the affairs of the German states and arrange the religious peace, Charles V. resolved to abdicate in favor of his son Philip. Accordingly, in 1556, he retired to a monastery in the western part of Spain, where, two years later, he died.

5. The Trojan war occurred in the Heroic age of Greece, its legendary date being 1194–1184 B.C. Tradition says that a son of the king of Troy visited the Spartan king, Menelaus, secretly stole his wife, Helen, and carried her to Troy. All the heroes of Greece took up arms, sailed across the Ægean sea and besieged Troy for ten years. The city was finally taken by stratagem. Acting upon a plan of Ulysses, the Greeks built upon the plains near the city a large wooden statue of a horse in which they concealed several warriors, and then retired to their ships. The Trojans gathered in wonder about the statue which the Greeks had left, and finally drew it within the walls of their city. At night the concealed warriors left the statue, opened the gates of the city, and admitted the Grecians. Troy was thus captured, and was burned to the ground.

During the time of the siege the warriors of the two armies fought upon the plains near the city in general battle as well as in single contest. Achilles was foremost in every fight, but his chief having taken from him a maiden who fell to him as a prize, Achilles became angry and refused to fight again. The Greeks sought his aid in vain till Patroclus, Achilles' friend, was killed by Hector. Then Achilles went forth, slew Hector, and dragged his body fastened to chariot-wheels three times around the walls of Troy. These latter events commencing with Achilles' anger and ending with the funeral of Patroclus and Hector, form the subject of Homer's "Iliad."

Because the Grecian heroes had destroyed the altars of the Trojans, the gods showed their disfavor by compelling many of them to wander endlessly over sea and land. The wanderings of Ulysses are told by Homer in his "Odyssey."

6. Aristides was chosen the first president of the Confederacy of Delos (477 B.C.).

Miltiades commanded the Athenians in the battle of Marathon and led them to victory.

Leonidas held the pass of Thermopylæ with a few hundred Spartans. He would not retreat, but remained fighting until every man was killed.

In the naval battle of Salamis (480 B.C.) Themistocles directed

ne fleets of the Greeks, and through his stratagem the Persian fleet was overcome.

Socrates, when unjustly sentenced to drink the poisonous cup of hemlock, met death calmly, and during his last hours discoursed to his disciples on the immortality of the soul.

7. Athens and Sparta. Athens was defeated with immense loss. The war occurred, 431–404 B.C.

8. Between Octavius and the combined fleets of Antony and Cleopatra, 31 A.D.

9. The Spanish Armada was a large naval armament, consisting of 130 ships, fitted up in the harbors of Spain by King Philip II.

Before the death of Mary Queen of Scots, she bequeathed to Philip II. her claim to the English crown. The object of the Armada was to secure this claim to Philip, to avenge Mary's death, to punish Elizabeth for aiding Philip's rebellious subjects in the Netherlands, and to deal a fatal blow to the Reformation by crushing the Protestants in England.

From the time of its defeat, Spanish supremacy among the states of Europe, and Spanish power, rapidly declined. England was left mistress of the sea; and the cause of Protestantism was made safe.

10. Charles I. became king of England when 25 years of age (1625). He held the same idea which his father held, that the king ruled by "Divine Right, and therefore could not rule wrong." This brought him into immediate contest with Parliament. After dissolving the first and second Parliament of his reign, he was obliged to fall back upon Parliament for money necessary to carry on the government. The course he pursued with the body is marked by insincerity and an entire neglect of the rights of the people. From 1629–1640 Charles ruled without Parliament, the law being enforced by three courts known as *Council of the North*, the *Star Chamber*, and the *High Commission Court*. All these courts sat without a jury and were composed of favorites of the king.

Many illegal and unjust taxes were imposed, and other rights of the people were disregarded. The attempt to impose the English liturgy upon the Scotch Presbyterians led to a riot in Edinburgh, and all classes of the people bound themselves by a covenant to resist this imposition of the king. War ensued, and Charles summoned Parliament, then dissolved it, because the Commons, instead of voting money for the king to use in the war, gave their attention to the grievances of the Scotch people. When the Scottish forces crossed the border Charles again summoned the two Houses, and this meeting of Parliament lasted twelve years, they having made a law not to adjourn or dissolve without their own consent.

Parliament set to work to check the course of the king. The three illegal courts were abolished and the king's most unscrupulous agents were beheaded. An attempt on the part of Charles to seize five members of the House whom he had charged with treason threw the country into civil war, which lasted six

years. During this war Oliver Cromwell came into prominence as leader of the Independents. At the battle of Naseby, the decisive engagement of the war, the Royalists were defeated and Charles fled to Scotland. Here he refused to sign the covenant, and therefore was given up to the English Parliament. The king was kept a prisoner for some time, but finally it seemed as though he would become reconciled to Parliament and restored to authority. This so displeased Cromwell and his followers that they resolved to exclude from the House of Commons all the members who favored the king's restoration, and then try Charles for treason. He appeared before this court of enemies, but denied their authority to try him. Notwithstanding this, before the close of a week Charles was condemned to be executed, and in a few days he was beheaded.

11. The Moslem power was met and checked in France by a powerful army under Charles Martel in the year 732 at the battle of Tours.

12. The Crusades; the invention of printing; the discovery of America; the Reformation.

13. The unjust and extravagant rule of the Bourbon kings; the wretched condition of the mass of the people.

Lafayette, Marat, Robespierre.

14. From 1815 to 1848 France was governed by kings. In 1848 a republic was formed and Louis Napoleon was chosen president. In 1852 Louis was made emperor of France with the title of Napoleon III. In 1871 France was proclaimed a republic, and still retains this form of government.

15. The Bill of Rights was added to the English Constitution, and made effectual by appropriate legislation. This Bill of Rights "transferred sovereignty from the king to the House of Commons; declared that all persons holding communion with the Church of Rome or uniting in marriage with a papist should be forever incapable to possess, inherit, or enjoy the crown and government of the realm," and secured to the people all the liberties which the Stuarts had violated.

16. Edward VI., Mary Tudor, and Elizabeth.

17. The Crusades lasted two centuries and kept all Europe in a state of disorder during that period. It is estimated that from two to six million lives were sacrificed. From this there resulted license and crime. The church, through the death of crusaders, came into possession of wealth, which increased its power, its influence and authority.

The civilization of the East was in advance of that of the West, and through the contact with the Mohammedans a knowledge of several arts and manufactures was gained; education was stimulated in receiving from the Arabians the elements of arithmetic, algebra, geometry, and astronomy, as well as the first knowledge of Plato and Aristotle. Modern commerce was first developed during the

crusades, and the common people began to acquire rights as the kings were compelled to grant charters of freedom to the towns.

18. The discovery of the properties of the magnet, and the invention of the mariner's compass.

19. The "Magna Charta" was granted by King John in 1215, under compulsion of the barons in arms. It established a fixed mode of administering justice. Its most important declaration was, "No freeman shall be arrested, or imprisoned, or dispossessed of his tenement, or outlawed, or exiled, or in any wise proceeded against; we will not place or caused to be placed hands upon him, unless by the legal judgment of his peers, or by the law of the land. Justice shall not be sold, refused, or delayed to any one."

20. Queen Victoria assumed the sovereignty of Great Britain June 20, 1837. She was crowned Queen June 28, 1838.

ANSWERS TO PHYSICS.

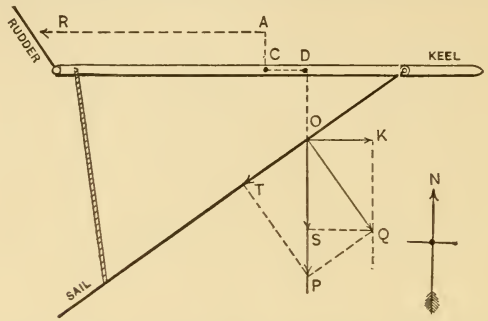
1. The initial velocity, 176 ft., divided by 32 ft., the velocity it loses every second it ascends, gives $5\frac{1}{2}$ seconds, the time it is rising. The distance it rises always equals the distance it would have to fall from to acquire the same velocity. It would therefore fall in $5\frac{1}{2}$ sec. $(5\frac{1}{2})^2 \times 16$ ft. $= 484$ ft.; or what is the same, it would rise 484 ft. The body would return in 11 seconds.

2. In the lever we have weight 200 lbs., weight's distance 6 in., power's distance 60 in., and power x.

Then $W. \times W.\,d = P. \times P.\,d$, or $200 \times 6 = X \times 72$, whence $X = 16\frac{2}{3}$ lbs., the weight that must be attached to the long arm of lever to balance 200 lbs. attached to the short arm. Regarding the diameter of a pulley-wheel as a lever, the weight's distance and the power's distance are equal in a fixed pulley, and therefore no power is gained; in a movable pulley the power's distance is double the weight's distance, so one pound of power will balance 2 pounds of weight. Hence $8\frac{1}{3}$ lbs. must be attached to the free end of the rope.

3. Let C be a point in the keel vertically below the *centre of displacement* of the boat. This is the point about which the boat turns Let OP represent the direction and force of the north wind on the sail. Resolve OP into two components, OT in the direction of the sail, and OQ perpendicular to the sail. OT can have no effect on the boat, but a component of OQ which is parallel to the keel will be the force by which the boat is driven forward. Therefore resolve OQ into two components, OK parallel to the keel. and OS perpendicular to the keel. OS tends to cause a sidewise movement perpendicular to the keel called *leeway; OS* also tends to turn the bow to the north with a turning moment equal to the product of OS into CD, its perpendicular distance from C.

Then OK is the only component of the original force OP that tends to move the boat forward. Also the product of the force



OK into the distance OD provides a turning moment opposite in effect to that of OS into CD. Now the rudder must be set to counteract the turning effect of $(OS \cdot CD) - (OK \cdot OD)$.

Suppose the rudder held as shown in the figure. The water furnishes a resistance to its movement. Let the force R be the component of this resistance, parallel to the keel. Then the perpendicular distance between R and C is the lever arm on which R acts, and the turning moment furnished by the rudder equals the product of R into CA, which product must equal $(OS \cdot CD) - (OK \cdot OD)$ in order that the boat may be kept in its course.

4. The loss in weight of the solid when immersed in water is 4 pounds, which is the weight of a volume of water equal to the solid. And since the solid loses 8 pounds when weighed in the liquid, 8 pounds is the weight of a volume of the liquid equal to the solid. As a volume of the liquid weighs twice as much as an equal volume of water, the specific gravity of the liquid is 2.

5. "The velocity of sound in air depends on the elasticity of the the air in relation to its density. The greater the elasticity, the swifter is the propagation; the greater the density, the slower is the propagation." A rise in temperature, other things being the same, would expand the air, making it less dense; hence sound would travel faster.

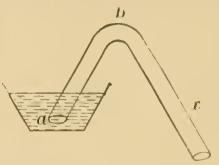
6. When the pressure of the atmosphere is 14.7 pounds to the square inch, it will sustain a column of mercury one inch square and thirty inches high. Thirty cubic inches, then, weighs 14.7 pounds; and 1728 cubic inches, or a cubic foot, will weigh 14.7 pounds $\div$ 30×1728 or 846.72 pounds.

7. The screw is a modification of the inclined plane. If a piece of paper be cut in the form of a right angle triangle, and wrapped around a cylinder with the perpendicular of the triangle parallel to

the axis of the cylinder, the hypothenuse of the triangle will describe a screw line on the surface of the cylinder.

8. By "persistence of force" is meant that any particular form of energy may be destroyed, but only on condition of an equivalent amount of energy in some other shape coming into existence. Illustration: Heat changed to mechanical energy, and this changed to electricity.

9. Let *a b c* be a siphon. Supposing it full of a liquid, the liquid will flow from the short branch to the long one. The pressure of air upon the end of the siphon *c* and upon an equal area of the water in the basin is the same. But the column of water in the longer branch is heavier than that in the shorter branch by *x c*. Consequently the liquid will flow from left to right.



Intermittent wells and fountains are natural siphons.

10. The relative pressure of the water in the two tanks is the same, as pressure is in proportion to the vertical depth, and is not dependent upon the shape or size of the communicating pipes.

11. There is no absolute gain. By means, however, of these powers, a force of small intensity may be made to act through a considerable space, and become transformed into a force of increased intensity acting through a proportionally diminished space.

12. The pressure of the atmosphere or of confined steam, and the nature of the material of the containing vessel.

13. Frost is deposited on bodies cooled below the freezing point by the solidifying, in the form of frost crystals, of the aqueous vapor in the atmosphere, without passing through the liquid state.

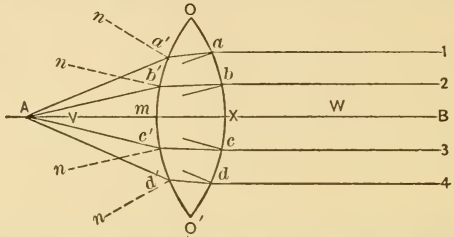
14. Echo is caused by the reflection of sound waves. A reflecting surface, to produce the echo of a syllable, must be 112.5 feet distant; for taking the velocity of sound at ordinary temperatures to be 1125 feet a second, and remembering the fact that not more than five syllables can be distinctly heard in a second, the syllables must follow each other at intervals of $\frac{1}{5}$ of a second, or be 225 feet apart. As this distance includes the going and returning of the sound, the reflecting surface must be distant 125.5 feet.

15. Differences in the color of substances result from the fact that one portion of the colored rays combined in white light is absorbed in the surface of the body. A body appears red because it absorbs all the colors except red, which it reflects to the eye. It appears white when it reflects all the colors and absorbs none: black, when it absorbs all of them and reflects none.

16. When the bottom can be distinctly seen, it appears higher than it really is because of the refractive power of water.

17. The line *A B* is the axis of the lens. The lines 1, 2, 3, 4, are

rays of light parallel to the axis and incident to the surface $O\,X\,O'$. At the points of incidence a, b, c, d, draw from the centre of curvature V, the radii va, vb, vc, vd, which form the normals (or perpendiculars). The rays of light in passing into the denser medium of the lens will be refracted toward these normals, and will strike the surface O, m, O' at the points a', b', c', d'. From the centre of this curvature W, and from these points, draw the normals $a'n$, $b'n$, $c'n$, $d'n$.



The rays in passing out of the lens are refracted from the normals and come to a focus at A.

18. By the refraction and reflection of the rays of sunlight.

19. Short-sightedness is caused by a too great convexity of the cornea or of the crystalline lens, which brings the focus in front of the retina.

The cause of long-sightedness is that the eye is not sufficiently convergent, and the image of objects is formed behind the retina. Concave glasses are required in short sight, as they cause the rays from objects to diverge, and thus throw the focus farther back. Long-sightedness requires convex glasses, which by their converging power bring the image forward, and, if properly chosen, form it on the retina.

20. The production of an electro-magnet at a distance by making and breaking the circuit of a current of electricity

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ANSWERS TO CHEMISTRY.

1. Affinity is the attractive force acting between atoms, causing them to enter into combination. It always acts between definite quantities of matter, and is often dormant until it is made active by heat or some other force. Cohesion is the force which binds molecules together, holding them in mass.

2. An element is a substance which has not been divided into more than one kind of matter.

3. No. The properties of sulphur and carbon differ, as is well known. When, however, the vapor of sulphur is passed through a cylinder heated to redness and containing charcoal, there is formed carbon disulphide, CS_2, a colorless, highly refracting liquid, which evaporates quickly, and whose fumes are poisonous.

Mercury is a heavy liquid metal; chlorine is a greenish-yellow gas. These two elements unite to form HgCl, mercurous chloride, *calomel*, and $HgCl_2$, mercuric chloride, *corrosive sublimate*—the first is used as a medicine, the second is a deadly poison.

4. The combining weight of an element compared with that of hydrogen is its atomic weight.

The quantivalence of an atom is its combining power measured by the number of hydrogen atoms with which it can unite, or for which it may be exchanged.

5. Heat and solution hasten chemical action, as they tend to overcome the force of cohesion. Heat in most cases will convert a solid into a liquid and a liquid into a gas, while in some cases it breaks up the molecules themselves.

6. Common salt, NaCl, supplies chlorine for the hydrochloric acid which is one of the constituents of the gastric juice. Sodium is an indispensable constituent of the bile, without which the bile could not properly assist in digestion.

7. The yeast changes into sugar a part of the starch of the flour, and then converts this sugar into alcohol and carbon dioxide or carbonic acid gas. This gas, unable to escape from the glutinous dough, collects within it in bubbles and causes the dough to swell. The heat in baking kills the yeast plant and stops the fermentation.

In biscuit-making with sour milk bicarbonate of soda is used. Carbonic acid gas is given off by the reaction of these two compounds with fermentation, as in the use of yeast.

8. (*a*) If calcite is used a brisk effervescence ensues; (*b*) the resulting products are carbon dioxide, CO_2, and calcium chloride, $CaCl_2$.

9. Carbon dioxide. It varies from 2.7 to 3.5 volumes in 10,000.

10. (*a*) Allotropism is the capability an element has of appearing under different forms with different properties; (*b*) the allotropic forms of carbon are the diamond, graphite, and amorphous carbon; ozone is an allotropic form of oxygen.

11. There are two compounds of oxygen and carbon: CO, carbon monoxide, and CO_2, carbon dioxide. CO may be produced by heating in a flask 1 part by weight of potassium ferrocyanide and 10 parts of sulphuric acid. It is a colorless, tasteless gas, having a faint odor, and is a deadly poison. It is lighter than air, and burns with a lambent, blue flame.

CO_2 may be produced by pouring hydrochloric acid upon limestone. It is a colorless gas, so heavy that it may be poured from one vessel to another. It is odorless, a non-supporter of combus-

tion, and is soluble in water at ordinary temperature, volume for volume. Its presence in air to the extent of one tenth part produces suffocation and death. An aqueous solution of CO_2 has an acid reaction upon litmus.

12. They differ in the proportion of carbon and other elements present, either as mixtures or compounds. Pig-iron contains from two to six per cent of carbon, besides small amounts of sulphur, silica, phosphorus, and manganese.

Wrought-iron contains less than one half per cent of carbon. Steel is intermediate between these two, and contains from seven tenths to two per cent of carbon, and a small amount of manganese.

13. (*a*) An explosion takes place and the gases combine with loss of volume. (*b*) Water. (*c*) $\frac{8}{9}$ of H_2O by weight is O; then 18 gr. of O is $\frac{8}{9}$ of the resulting quantity of water, or $20\frac{1}{4}$ grains.

14. (*a*) Different substances sometimes contain the same elements in the same proportion. This peculiar phenomenon is called *isomerism*. (*b*) Acetic acid and methyl formate, though different substances possessing different properties, have the same formula, $C_2H_4O_2$.

15. (*a*) Compound radicals are groups of atoms which seem to determine the character of a molecule. (*b*) Methyl, CH_3, formed by removing one of the hydrogen atoms from methane or marsh gas, CH_4. It combines with one atom of an univalent element as chlorine or bromine, forming the compounds CH_3Cl, CH_3Br. Removing one atom of H from NH_3, ammonia gives the radical NH_2, amidogen, which uniting with one atom of potassium forms potassamine, NH_2K, and when combining with one atom of the radical methyl CH_3 forms methylamine. (*c*) Organic chemistry.

16. Starch, $C_6H_{10}O_5$, is a substance found in all cereals, in the tuber of the potato plant, and in the roots, stems, and fruits of many other plants. It is composed of microscopic grains differing in size and shape in different plants. The grains swell and burst, forming a pasty mass, when heated in water nearly to the boiling-point. The various uses of starch are well known. The test for starch is iodine, with which the starch paste forms a blue compound.

17. The light is almost wholly produced by small particles of carbon heated to incandescence.

18. Left for the student.

19. H_2O, water; HNO_3, nitric acid; H_2CO_3, carbonic acid; NaCl, common salt; N_2O, laughing-gas.

20. Chlorine is chiefly used as a bleaching agent. It is also a powerful disinfectant. Its color is yellowish green.

21. Acids and bases are substances having properties chemically opposite. Acids have a sour taste, change certain vegetable colors, as the reddening of blue litmus, and have the power of giving up hydrogen and taking up metals in its place.

A base has the power of neutralizing an acid, and restores most colors that have been reddened by an acid.

A salt is formed by the reaction of an acid and a base, and has no effect upon vegetable coloring.

22. Concentrate to one half of its volume the water to be tested. Acidulate with nitric acid, and then add a few drops of silver nitrate, $AgNO_3$. If a white precipitate results soluble in ammonia, NH_4HO, and insoluble in nitric acid, HNO_3, the presence of a chloride is indicated.

23. Carbonic acid gas is destructive of animal life, the lungs being unable to decompose the gas and appropriate the oxygen it contains. It is indispensable to plant life. The leaves, roots, and green parts of plants absorb it in sunlight and give off oxygen.

24. Dynamite is nitro glycerine absorbed by some porous inert solid. By experiment it has been found that a silicious earth found in Hanover is the best absorbent. This earth when dry is a white impalpable powder, and will absorb and safely retain three times its weight of nitro-glycerine. Nitric acid.

25. Oxygen and hydrogen. The lime heated to incandescence emits the intense light.

ANSWERS TO GEOLOGY.

1. All rocks are divided into two great classes, viz., *stratified rocks* and *unstratified rocks.*

2. Stratified rocks are more or less consolidated sediments, and are usually, therefore, more or less *earthy* in structure and of *aqueous origin.* Unstratified rocks have been more or less completely fused, and therefore are *crystalline* in structure and of *igneous origin.*

3. For first part see answer to 4th.

Schist is a rock that breaks into slabs or plates owing to the arrangement of the mineral ingredients in layers; particularly the hornblende or mica.

4. Shale divides easily into thin plates irregular and often fragile, but slate divides easily into thin, even, hard slabs. Grit is a coarse sandstone, not evenly grained, containing small pebbles.

5. Strata are layers of rock and may be made up of many laminæ. Strata vary from an inch to many feet in thickness.

Laminae are the thin paper-like layers of the stratified rock, and are only found when the material is fine-grained.

6. It is probable that petroleum was formed by a change of organic matter, somewhat similar to that which makes coal, but

from a different kind of organic matter, and under different conditions. Land plants, in the presence of fresh water, form coal; while marine plants, and sometimes lower animals, in the presence of salt-water, form petroleum, bitumen, etc. It has been observed that petroleum is often found in connection with salt. *Le Conte.*

7. Gneiss is a crystalline rock consisting of quartz, feldspar, and mica, but having a bedded structure which is due to the arrangement of these minerals.

If rock consists of feldspar and hornblende, or these with quartz, it is called *syenite.*

8. In the palæozic rocks.

9. Argillaceous sandstone is a rock in which the sand is cemented together by a fine earthy or clayey material.

10. By its hardness, 7 in the scale of hardness; by its lack of cleavage; by its infusibility.

11. There are five geological eras. The first is the Archæan or Eozoic, characterized by no life or doubtful life.

Second, the Palæozoic era, which is divided into three ages,—1, *age of invertebrates;* 2, the *age of fishes;* 3, the *age of acrogens* and *amphibians.*

Third, the Mesozoic era, which represents the *age of reptiles.*

Fourth, the Cenozoic era, which represents the *age of mammals.*

Fifth, the Psychozoic era, of the *age of man.*

12. The presence of granite at the existing surface must in all cases be due to the removal by denudation of the masses of rock under which it originally consolidated. *Encyclopædia Britannica.*

13. It is believed that the rocks which formed the first dry land have not been discovered, because the oldest known rocks are stratified or fragmental, and therefore have been formed from still older rocks.

14. (*a*). Eocene, Miocene, Pliocene.

(*b*). Eocene comes from two Greek words, meaning *dawn* and *recent;* Miocene, from two Greek words, meaning *less* and *recent;* Pliocene from two Greek words, meaning *more* and *recent.*

ἠώς = dawn,
καινός = recent,
μείων = less,
πλείων = more.

15. They have a knowledge of the depth from ten to twenty miles.

16. The earth is a spheroid; and that form would have resulted from the revolution of a heated mass on an axis.

In sinking shafts for artesian wells, the temperature has been found to increase one degree for every 64 feet of descent.

A line of volcanic islands encircles the globe, and would indicate, by their eruption, fire beneath.

17. Feldspar.

18. They were originally horizontal, but are now tilted at all angles. The reason of this tilting is that the outer crust cooled first and became fixed. Layers below then cooled and contracted, thus forcing wrinkles into the outer crust.

19. A metamorphic rock is crystalline in texture, and is supposed to be formed from sediments, but has been changed by heat and pressure.

20. First, by what is termed the method of superposition, by which the lowest strata are determined, these being conceded to be the oldest.

Second, by means of the fossils.

21. They must have been formed by the evaporation of lakes or seas at former geological periods.

22. Basaltic material was thrown up in a melted condition through fissures, not only filling them, but spreading over the surface above.

23. Most carbonate rocks effervesce in acids. Calcite, Aragonite, Malachite.

24. Dip is the angle or slope of strata that are inclined or tilted. Strata were originally horizontal in position, but have been more or less inclined by pressure.

25. The old red sandstone are included in the Devonian rocks, or second division of the Paæozoic strata, while the carboniferous rocks constitute the third division of the Palæozoic strata.

26. The glaciers of the present time erode; leave grooves in the rocks over which they pass; transport and drop materials.

27. The Medina sandstone belongs to the Niagara Period of the Upper Silurian; the Potsdam sandstone to the Primordial; the Genesee shale to the Hamilton Period of the Devonian.

28. Limestone is found everywhere, and is the remains of animals that once lived in the sea.

29. The silica which forms the flint has been diffused in small quantities throughout the lime, and, by some process not thoroughly understood, the soluble silica segregates into a form more or less spherical.

30. Left for student.

ANSWERS TO BOTANY.

1. To expose unassimilated food to the sun for elaboration.

2.

Indeterminate.
- Raceme—Lily-of-the-valley;
- Panicle—Meadow-Sweet;
- Corymb—Hawthorn;
- Umbel—Caraway;
- Head—Dandelion;
- Spike—Plantain;
- Catkin—Willow;
- Spadix—Indian turnip, Calla.

Determinate.
- Cyme—Mountain Ash, Viburnum;
- Fascicle—Sweet William.

3. By runners which strike root at the end and produce new plants.

4. If it came from the axil of a leaf, it would be a modified branch.

5. In "doubling," stamens and pistils develop into petals. Any cultivated rose will illustrate.

6. The outside of the ovary wall.

7. The silk is a mass of pistils.

8. Monopetalous The "flower" is a cluster.

9. In the cyme, the terminal bud blossoms first; in the raceme, the stalk continues to grow and blossom above the first flower.

10. A stem has leaves, or what answers to leaves; a root has not.

11. Adventitious buds are those that appear seemingly by chance on the surface of the wood, especially where it has been bruised. They have been known to form on the root and leaves. They grow out into slender twigs, and are produced on willows, as they afford excellent material for basket-work.

12. (*a*) Of leaves. (*b*) The end of the stem leaves. (*c*) A stem. (*d*) A leaf. (*e*) A stem.

13. The pine, hemlock, juniper, cedar, arbor-vitæ. The larch is a deciduous conifer.

14. By the falling of flower-pollen on the pistil of the same or of different flowers. By insects. By the wind.

15. The stamens of the wild rose change into the petals of the cultivated rose. Pond lilies have been made blue. Varieties of tomatoes have been made by hybridizing.

16. A tuber is a thickened end of an underground stem. Example, a potato.

A bulb is a thickened end of a stem wrapped in the thickened bases of leaves. Example, white lily.

A corm is an enlarged end of an ordinary stem. Example, crocus.

17. The calyx produces what is outside the green line which shows when the apple is cut horizontally.

The receptacle develops into the greater portion of the straw berry.

18. Movement of the contents of cells has been seen under a microscope—usually a streaming or rotary motion (Tape-grass, a water plant).

Ordinary roots turn from the light, leaves toward it, even at the expense of much movement. A leaf will turn if the wrong side is exposed to light. Twining stems (bean) turn successively in all directions, as do tendrils (pea). Tendrils curl from irritation also.

The sensitive plant exhibits motion from the same cause. The Venus fly-trap has a leaf that catches insects for food by closing suddenly when touched by them. Some pods discharge their seeds forcibly when touched (jewel-weed). In the fertilization of ferns, the bodies discharged from the *antheridia* travel over a moist surface by means of minute cilia.

18. Forestry treats of the growth and characteristics of trees, discusses their value, tells how they should be cut or preserved, and mentions their foes. The history of the old world and observations in our own country have convinced men that forests have an influence upon climate. The removal of them exposes lands to winds. There is some reason to think that the amount of rainfall is affected by their presence. The leaf-mould and higher soil about roots hold water that evaporates slowly, or sinks into the soil, or supplies streams.

It is the object of forestry associations to promote a knowledge of the science, and to create a sentiment that will lead to the preservation of trees. Laws are necessary to this end, because there are men too selfish or short-sighted to appreciate the effects of forests.

20. The *Acer* (maple) is less rigid in appearance than the *Pinus* (pine). Branches of the *Acer* seem continuous from the stem, those of the *Pinus* seem driven in. The leaves of the first are simple, palmately lobed, with stalk and blade; those of the other are needle-shaped. The *Acer* is deciduous, the *Pinus* is not The seed-vessel of the *Acer* is a closed body; the scale of a pine cone answers to a seed-vessel—the seeds being on the upper face.

21. A fruit is a matured ovary with what adheres to it. The fruit of the potato is the "ball."

22. They are one agency for depositing pollen on pistils not fertilized by stamens of the same flower.

23. Roots, stems, leaves, fruit (ovary and calyx or ovary), seeds.

(In confectionery we eat entire flowers.)

24. Stamens and pistil; one to secrete pollen, the other to form seeds.

25. The oak grows by one main stem that has much wood; the lilac by several stems, not so high; the spire of grass has little wood, and is low. They are respectively a tree, a shrub, an herb.

26 The oak leaf is pinnately lobed; the maple palmately lobed; the plantain, entire.

27. In a cross-section of a cornstalk the wood shows as dots at irregular intervals; in the maple, as rings. In the cornstalk the wood forms in threads at no fixed place. In the maple, a ring is one year's growth. The cornstalk is an endogen, the maple an exogen.

28. The elm forms seeds in a closed ovary; the pine pistil is a scale. Classes are angiosperms and gymnosperms.

29. The eucalyptus or fever tree is a native of Australia, and was brought into France at the beginning of the present century. It is only about thirty years, however, that its surprising medicinal qualities have been known. It has been planted near Rome; in Valentia, Spain; in Algiers, Mexico, Cuba, at New Orleans, and many other places, to counteract fever and malaria; and marked improvement in the healthfulness of these localities has been observed. Either by killing or absorbing the spores it prevents malaria and fever. The tree has a tall, smooth, reddish stem, with ragged bark and an odorous smell. The trunk is from forty to forty-five inches in diameter when grown.

ANSWERS TO ZOOLOGY.

1. From *zoon*, an animal, and *logos*, discourse. Zoology treats of the classification, structure, and habitat of animals.

2. According to *Le Conte*, a fauna is a natural group of animals in one place, differing more or less conspicuously from other groups in other places, and separated from them by physico-geographical boundaries, or by physical conditions of some kind.

3 Reptiles have no gills, while amphibians have gills when young, and true lungs when adult; in reptiles the ribs are well developed, but in amphibians they are usually small or wanting; the skull of reptiles articulates with the spinal column by one condyle; in the amphibia the skull articulates with two condyles.

4. The heart of a bird has four cavities, while that of a snake has three.

5. (*a*), (*b*), (*c*), (*e*), and (*h*) to Mammalia; (*d*) to Lamellibranchiata; (*f*) to Insecta; (*g*) to Aves.

6. Left for student.

7. Raptores. They have a hooked bill, short strong feet, and sharp hooked claws.

8. It has a long proboscis, by means of which the liquid food is pumped up into its mouth.

9. The *dorsal* fins located on the back; the *caudal* fin at the extremity of the tail; the *anal* fin on the abdomen near the tail; the *pectoral* fins immediately behind the gill openings; the *ventral* fins on the abdominal surface near the *pectoral*.

10. Because they have an internal jointed skeleton; a nervous cord on the dorsal surface, which is separated from the body-cavity.

11. To Mammalia, because they suckle their young; the thorax and abdomen are separated by a perfect diaphragm; the red corpuscles are double concave, having no nucleus; the heart has four cavities, and they have lungs.

12. Left for student.

13. To the order Rodentia. See answer to question 19 for characteristics.

14. The mole has a long cylindrical body covered with thick velvety fur, somewhat grayish in color. The eyes are minute and almost hidden by the fur. The muzzle is long, with the nostrils close together. The fore legs are short and muscular, terminating in broad shovel-shaped feet with strong flattened claws; the hind feet are long and narrow with slender claws. The mole lives chiefly under ground. Its habitation, which is in some secure place, as under a hillock or the roots of a tree, contains two circular galleries, one above the other, with five connecting passages, and a central chamber which has access to the upper gallery by three passages. Passages lead away from the lower gallery in several directions, to the animal's domain, where it tunnels in search of common earth worms—its chief food. Moles are very voracious animals, possess rapid digestion, and die in from ten to twelve hours if deprived of food. The mole breeds in spring and autumn, producing from four to five young at a birth.

The mole belongs to the order of Insectivores, which are small, insect-eating animals. The molar teeth have sharp pointed cusps. The legs are short, and the feet are formed for walking or grasping, and are plantigrade with five toes and claws.

15. The shape of the skeleton is such as to give a boat-like form to the body, adapting it for easy movement through the air. The head is articulated by a single pivot, thus allowing a free turning of it. The breastbone is large, serving well for the attachment of the strong muscles which move the wings. The vertebral column has little flexibility. The ribs are stronger in proportion than in quadrupeds, and each rib has in the middle a flattened bony process which runs obliquely backward to the next, affording perfect freedom of breathing during flight, and giving strength to this part of the body for the powerful action of the wings.

Numerous air-cells penetrate the substance of the bones as well as other parts of the body to give buoyancy.

16. *Raptores*, or birds of prey, differ from all other birds, except parrots, in having a strongly hooked bill and a waxy membrane at the base of the upper mandible; and from parrots in having three toes in front and one behind. The toes are armed with long, strong, crooked talons; the legs are robust; and the wings are of considerable size, adapted for rapid and powerful flight. The bill is stout and sharp, and usually toothed. All are carnivorous. The female is larger than the male, except the condor.

Orton.

17. The frog's body has two parts, the head and the trunk, there being no tail and no neck. It has two pairs of limbs. The fore-legs are situated immediately behind the head, and are much shorter than the hind legs. Each fore-leg consists of three parts, which correspond to the arm, fore-arm, and hand in man. The manus has four digits answering to the second, third, fourth, and fifth fingers in man. There is no web between these digits.

The hind legs have also three parts, which correspond to the thigh, the leg, and the foot in man. The foot is large compared with the other two parts, and has five long slender digits, which correspond to the five toes in man, and are joined by a thin web. The whole body of the frog is covered with a smooth, moist integument which has neither hairs nor scales. There is a large dark circular spot on each side the head behind the eye, which is the outer layer of the membrane of the drum of the ear. The eyes are large and projecting, with well-developed lids which shut over the eyes when they are drawn back. The upper jaw is set with many small sharp teeth, and there are two clusters of similar teeth in the fore part of the roof of the mouth. The lower jaw bears no teeth. The tongue is fleshy, free at its posterior end, and is attached at its anterior end to the middle part of the lower jaw.

In addition to its lungs, the frog has a secondary apparatus for respiration—the skin. By keeping this moist, the blood is purified. Were it not for this the frog could not live under water.

The diaphragm of the frog is situated in front of the lungs, and not behind them as in the higher animals.

The frog has a vertebra but no ribs.

While still within the egg, the embryo assumes the form of a minute fish, devoid of limbs, and with only rudiments of gills. After leaving the egg, the young acquire three pairs of external gills, attached to the sides of the hinder part of the head. The animal crops the aquatic plants, on which it lives, by means of the horny plates with which its jaws are provided. In the tadpole, as the larvæ frog is called, the intestine, which is relatively longer than in the adult, is coiled up like a watch-spring in the abdominal cavity. A membraneous lip surrounds the mouth, and the muscular tail acquires a large relative size. The eyes, and the nasal and

auditory organs become distinct, but no limbs are at first visible. A fold of the integument now grows back over the external gills, and unites with the integument covering the abdomen, leaving only a small aperture on the left side, through which the ends of the external gills of that side may for some time be seen to protrude.

The rudiments of the limbs appear, rapidly elongate, and take on their characteristic shape; only the hind pair being at first visible, because the anterior pair are hidden under the fold of the integument mentioned above. The lungs are developed and for a time the tadpole breathes both by them and by its external gills.

As the legs grow, the tail shortens, and, at last, is represented merely by the pointed end of the body. The gape elongates until the angle of the mouth lies behind the eye instead of a long way in front of it, as in the tadpole; teeth are developed in the upper jaw and behind it; the intestine becomes less and less coiled, as, not growing at the same rate as the body, it becomes relatively shorter; and the animal gradually changes its diet from vegetable to animal matters, the perfect frog being insectivorous.

18. They are distinguished, first, by having three pairs of jointed legs; second, by having head, thorax, and abdomen distinct.

19. Their canines are wanting, the incisors are long and curved, two on either jaw growing perpetually. The molars are flat and well adapted for grinding. All the rodents are vegetarian. Nearly all of them have clavicles, and the toes are clawed. The rodents comprise about two thirds of all known mammals. They range from the equator to the poles.

20. The bat belongs to the mammalia. It has very long fore limbs, adapted for flight, as the fingers are greatly lengthened and united by a membraneous web. One or two of the fingers, as well as the toes are set with hooked nails. Its clavicles are very long, and the sternum possesses great strength. The whole skeleton is extremely light. Its eyes are small, its ears large, and its sense of touch is very acute. The bat's favorite posture when at rest is that of suspension by the claws, with its head downward. It flies in a dodging manner, and its habits are nocturnal.

21. Its hooked bill.

ANSWERS TO ASTRONOMY.

1. The solar system is composed of the sun, the planets and their satellites, comets, and meteors. The sun is the central body and the largest member of the system. The planets are bodies revolving around the sun from west to east, in elliptical orbits. The asteroids are minor planets revolving around the sun outside the orbit of Mars. The satellites are small bodies revolving around the planets, and, with the planets, around the sun. For definition of a comet, see answer 16. Meteors are small, solid bodies revolving about the sun entirely independent of the earth, but which the earth encounters in its revolution around the sun. In falling through the earth's atmosphere, they become heated and give forth light.

2. The stars and nebulæ. The stars are bodies which give out light and heat, and which lie outside the solar system. Nebulæ are faintly shining patches of light. Generally speaking, nebulæ are thickest where the stars are fewest. Nothing is definitely known of the nature of nubalæ.

3. Venus, as seen from the earth, is the most brilliant and beautiful of all the planets. It presents phases exactly similar to those of the moon. At superior conjunction, the full disk of the planet is visible. This decreases gradually till at the point of greatest eastern elongation, when the planet has the form of the moon at first quarter. After passing this point, the planet wanes until near inferior conjunction, when its form is that of a crescent. Here its apparent diameter is more than six times as great as it was in superior conjunction.

Irregularities of the planet's surface are indicated by the jagged line which separates the dark and bright parts of the disk.

Jupiter is attended by four satellites, which move around the planet from west to east. When one of these satellites passes between Jupiter and the sun, a shadow of the satellite is thrown upon Jupiter's disk. When it passes through Jupiter's shadow the satellite is eclipsed. When it passes between the earth and Jupiter, there is a transit and the satellite is projected upon Jupiter's disk. An occultation occurs when Jupiter is between the earth and the satellite.

The disk of Jupiter is crossed by dark bands parallel to its equator and lying principally in this region. These bands are reddish in color, and their shapes constantly vary. Over nearly the whole surface of the planet are spread cloud-like forms, having every variety of shape, appearing at times as brilliant white masses.

The light from the centre of the planet's disk is twice as bright as that from its poles.

Saturn is of a dull yellowish color, surrounded by a pair of rings, and accompanied by eight satellites. The rings are the most striking feature of the planet. They are situated at a considerable

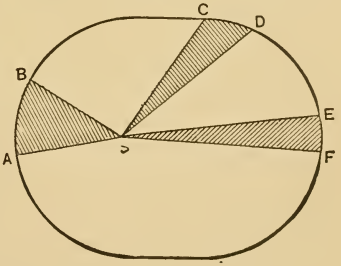
distance from the planet, in the plane of its equator, and inclined to the plane of its orbit about 27°. Owing to this inclination, the rings at certain points of Saturn's orbit appear as a single line of light.

The disk of Saturn is crossed by light and dark belts, though they are much more indistinct than those of Jupiter.

4. Neptune was discovered in 1846. Certain perturbations in the motion of Uranus had been discovered after that planet had been observed about thirty years. This led astronomers to suspect that these irregularities of motion might be caused by an unknown planet. Several astronomers, among whom were Leverrier, of France, and J. C. Adams, of England, set out to compute the position and magnitude of a supposed planet, by which these perturbations might be caused. The computations were laborious and long, and showed that the perturbations were such as might be produced by a planet about twice the distance of Uranus from the sun, and having a somewhat greater mass than this planet. The situation of the new planet was also predicted. Neither Leverrier nor Adams, who had been working entirely independent of each other, had telelescopes powerful enough to detect the planet; so they communicated the results of their computations to other astronomers having powerful telescopes. The astronomer who was searching at the suggestion of Leverrier was first to see the new planet, and so Leverrier obtained the chief credit of the discovery. An equal share of the honor, however, is accorded to Adams; for had not a series of accidents prevented, the planet would have been found by his computation of its elements.

5. Asteroids or planetoids. They are accounted for on the theory that the nebulous ring which occupied the space between the orbits of Mars and Jupiter was perfectly uniform in density, and that therefore condensation took place equally all around it, and the ring was thus broken up into a group of small planets.

6. Let *A B C D E F* be a planet's orbit and *S* the sun. Suppose the planet to move from *B* to *A* in the same time it would from *D* to *C* or from *F* to *E*; then the shaded portions which would be swept over by a line joining the sun and the planet, in the equal times, would all be equal.



7. *Every particle of matter in the universe attracts every other particle with a force varying directly as the product of the masses acted upon and inversely as the square of the distances between them.*

The earth's mass is taken as the unit.

8. A constellation is a group of stars bearing such a relation to

each other as to suggest some form or figure. The zodiac is a belt in the heavens usually regarded as extending 8° on each side of the ecliptic. It is mapped out into twelve parts or signs, each containing 30°. These signs take their names from twelve constellations which at an early time corresponded in position with the signs of the zodiac. Now, however, owing to the precession of the equinoxes, the signs and the constellations no longer correspond. Although the sun now crosses the equator and enters the sign Aries on the 20th of March, he does not reach the *constellation* Aries till nearly a month later.

9. Because the moon rotates on her axis while making one revolution around the earth.

10. Left for the student.

11. Mercury, Venus, the Earth, Mars, the Asteroids, Jupiter, Saturn, Uranus, and Neptune.

12. Parallax is the alteration in the apparent position of an object caused by a change in the position of the observer. Thus, a planet, viewed from one spot on the earth's surface, appears in a different position than it would if seen from another spot at a great distance from the first.

The most accurate method of determining the earth's distance from the sun is not by calculation from the sun's parallax, but by means of the velocity of light. It has been determined within a second that light passes from the sun to the earth in 498 seconds. This multiplied by the velocity of light per second gives the distance of the sun, a little less than 93,000,000 miles.

13. The Earth has one; Mars, two; Jupiter, four; Saturn, eight; Uranus, four; and Neptune, one.

14. The Great Bear or *Ursa Major;* the Little Bear, or *Ursa Minor; Draco; Cassеopeia;* and *Cepheus.*

15. A variable star is one which undergoes periodic changes of brightness.

Algol, the demon star, in the constellation of *Perseus,* is a remarkably variable star.

16. The sun at the equinoxes moves through the sky approximately on the celestial equator. This great circle cuts the celestial sphere in the *east* and *west* points of the horizon. When the sun has north declination, or is above the celestial equator, it rises north of the east point and sets north of the west point. The sun would therefore, at rising and setting, and for a little time after rising and before setting, depending upon its declination, shine upon the north side of a building, which, by the conditions of the question, runs east and west.

17. When the moon is so far from the earth that the vertex of the cone of shadow falls between the earth and moon, the moon will not cover the entire disk of the sun, and the observer will see

a bright ring around the dark body of the moon. This appearance is an annular eclipse.

18. South of the equator. The north star marks very nearly the north pole of the heavens. From the pole of a sphere to the equator is 90°. At the north pole of the earth the north star would be in the zenith, or have an altitude of 90°. If one should move south, the altitude of the star would decrease, and when one had gone 90°, or to the equator, the star's altitude would have decreased 90°. It would therefore have no altitude or be on the horizon line.

19. Altitude and azimuth; right ascension and declination; celestial latitude and celestial longitude.

The distance of a heavenly body above the horizon, measured on a vertical circle, is altitude; the distance on the horizon from the north or south point to the point, where a vertical circle passing through the body cuts the horizon, is called azimuth. It is never greater than 90°.

The distance a body is east of the meridian passing through the first point Aries, measured on the celestial equator or a parallel circle, is right ascension; the distance a body is north or south of the celestial equator, measured on the meridian, is declination.

The angular distance of a body north or south of the ecliptic is celestial latitude; the angular distance a body is east of the vernal equinox, measured on the ecliptic, is celestial longitude.

20. A planet is said to be in *conjunction* with the sun when it is in the same direction as seen from the earth, or when it is in the same part of the heavens.

It is said to be in *opposition* when it is exactly in the opposite part of the heavens from the sun.

The *transit* of a heavenly body is its passage across the meridian.

An *asteroid* is one of the group of small or minor planets revolving about the sun outside the orbit of Mars. The eccentricity of their orbits amounts sometimes to one eight of the diameter, and the inclination to the ecliptic in some intances exceeds ten degrees.

A *satellite,* or secondary planet, is one that revolves around its primary, and, with it around the sun.

21. The transit of a planet is its passage across the disk of the sun. As a superior planet is one having its orbit outside that of the earth, it can never come between the earth and sun to cross the sun's disk.

22. Apogee is that point in the moon's orbit farthest from the earth, while perihelion is the point in a planet's orbit nearest the sun.

23. Its tropics are determined by the inclination of its axis to the plane of its orbit or the planet's ecliptic. The planet's equator, and the circle made by the plane of the planet's orbit cutting it, are great circles. The small circles drawn upon the planet, parallel to its equator, where the plane of the ecliptic cuts the planet at the

farthest point below and above the equator, are its tropics. The small circles drawn from the poles of the planet's axis as a centre through the poles of its ecliptic are its polar circles. The zones are bands whose boundaries are marked by the tropics and polar circles.

24. A solar day is the time between the two successive passages of the sun over the same meridian, while a sidereal day is the time between the two successive passages of the same star over the meridian. The sidereal day, therefore, is the time it takes the earth to rotate, and is 23 hrs. 56 min. 4 sec. of mean solar time long. The solar day is longer than the sidereal day, because the earth moves forward in its orbit during its rotation, and has therefore to turn a little farther each day to bring the sun on the meridian.

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